A WORLD OF SYNTHETIC

MAY, 1944

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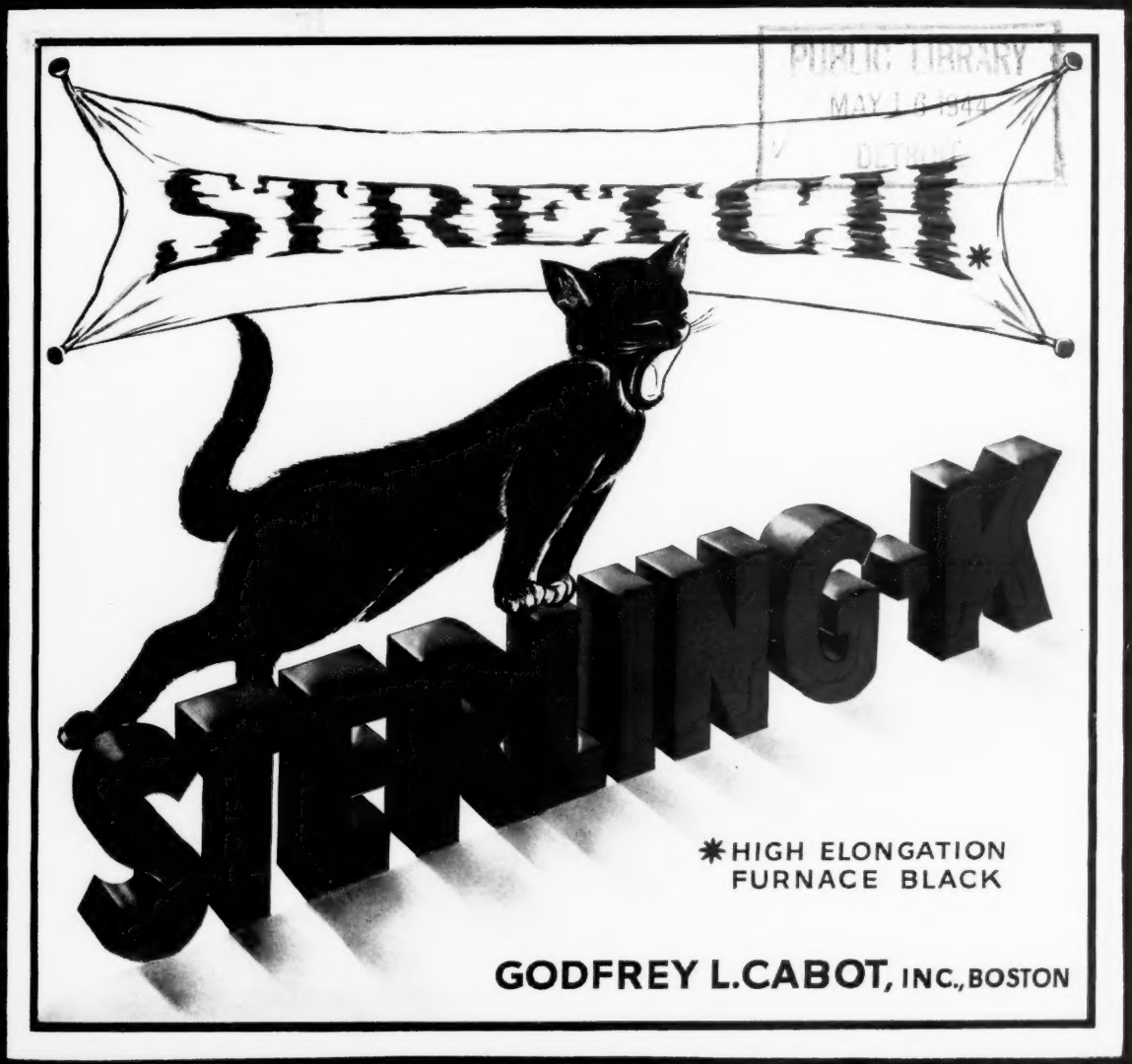
DETROIT



Newsletter No. 5
MAY, 1944
Published by Rubber Chemicals Division of DU PONT

ALDEHYDEAMINE ACCELERATORS ARE AVAILABLE

GR-S, now being made and consumed in large quantities, is requiring larger amounts of organic accelerators than were ever required for crude rubber. As a result, the capacity of the chemical industry is being taxed to the limit to produce enough total accelerator for the industry, and it is not surprising that shortages of specific accelerators frequently occur. The supply situation would be less acute if rubber manufacturers would adjust their GR-S stocks to use any and all accelerators instead of concentrating their choice on a certain few types. Flexibility in the use of accelerators and other chemicals should be the keynote of the technical program for 1944.

At the present time the accelerators of which there is the greatest unused manufacturing capacity are the aldehydeamines. These accelerators have been used to excellent advantage in rubber for many years and recent investigations indicate them to be excellent for GR-S as well. We strongly recommend the use of aldehydeamines in GR-S because (1) very good vulcanizates can be obtained with them, (2) they are available in considerable quantity and (3) their use will tend to alleviate an over-all accelerator shortage this year.

Of the various aldehydeamines, we recommend specifically Accelerator 808, Accelerator 833 and Vulcanex. Accelerator 808 and Vulcanex are also recommended as secondary accelerators for acidic types such as MBT, MBTS and Zenite and for Thionex.

ACCELERATOR 808 is probably the best general purpose accelerator of all the aldehydeamines; it is strong enough to be used alone in reasonable amounts and is an excellent activator for thiazolines, thiurams and thiazoles. As a primary accelerator, 1.5 to 2.5 parts of Accelerator 808 may be economically substituted for 0.5 part of Thionex with only a slight loss in rate of cure. The Accelerator 808 vulcanizates exhibit lower moduli, higher tensile strengths and elongations at break, and superior resistance to heat aging. Rate of cure may be increased by activating the Accelerator 808 with small amounts (0.1 to 0.2 part) of Tetrone or a dithiocarbamate; substitution of lime for zinc oxide also seems to have a beneficial effect. Increasing sulfur from 2.0 to 3.0 or 4.0 parts produces a tight cure in less than 30 minutes at 280° F. (35 psi steam) but results in stiffer vulcanizates. For special purposes where a very fast, low temperature cure is desired, a combination of 1 part of Accelerator 808 with 0.25 part of a dithiocarbamate and 1.0 part of sulfur may be used.

Activation with Accelerator 808 can effect valuable conservation of thiazoline, thiuram and thiazole accelerators. Accelerator 808 has been used as an activator for 2-MT in GR-S tread and carcass stocks with great success. Up to 40 per cent of Thionex may be replaced with Accelerator 808 without loss in rate of cure or physical properties. The most widely used thiazoles, MBT, MBTS and Zenite, may also be activated effectively with Accelerator 808 to effect improvement in physical properties and particularly resistance to stiffening upon exposure to heat.

VULCANEX is, in many respects, the most interesting aldehydeamine accelerator. Being weaker than Accelerator 808, Vulcanex finds its widest use in combination with other accelerators. When used in this way, Vulcanex seems to have a dual function. Not only does it activate vulcanization, but also it seems to stabilize the vulcanizate and inhibit partially the tendency to stiffen or become short upon heat aging. As an activator for thiurams, thiazoles and thiazolines, Vulcanex should be used in quantities of the order of 1.0 to 2.0 parts. For example, in tread type stocks containing 1.7 parts sulfur and loaded with 45 parts of EPC black, combinations of 1.0 part of Vulcanex with 1.0 part of 2-MT and 1.5 parts of Vulcanex with 0.3 part of Thionex, both produced tight cures in less than 60 minutes at 280° F. (35 psi steam). The latter stock had particularly good resistance to stiffening on heat aging.

ACCELERATOR 833 is one of the strongest aldehydeamines and has not been used extensively in GR-S stocks. However, in Neoprene Type GN, GR-M and Neoprene Type KNR cements the use of 1.5 to 4.0 parts of Accelerator 833 imparts ability to cure rapidly at room temperatures. In Neoprene Type CG adhesive cements, Accelerator 833 in conjunction with litharge provides a desirable degree of cure activation.

Through the mill

NEOPRENE LATEX DRUMS — Please return neoprene latex drums promptly. Rinse with water and do not use for other purposes. We will pay return transportation and ceiling prices for them from all points east of the Mississippi River. Ship in carload quantities when possible.

HELIOZONE is as good a sun checking inhibitor for GR-S as for natural rubber.

COLORS are coming back for use in GR-S. Du Pont Rubber Colors are again available, and the group has been streamlined to fit current needs.

BUTYL RUBBER — Have you investigated Polyac in GR-I?

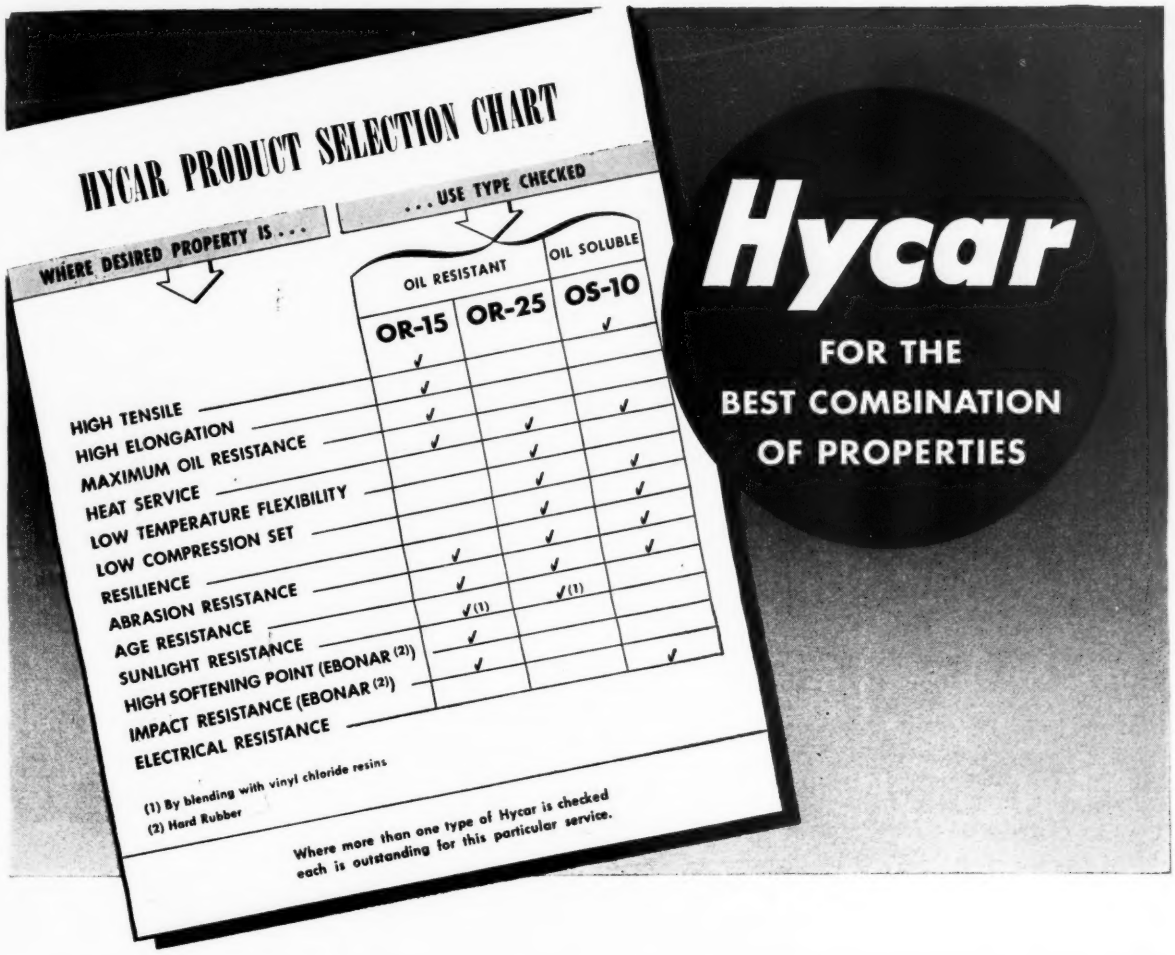
BACK THE ATTACK WITH WAR BONDS

DU PONT
REG. U.S. PAT. OFF.

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

India Rubber World, May, 1944, Vol. 110, No. 2. Published monthly by Bill Brothers Publishing Corp., 1309 Noble Street, Philadelphia 23, Pa. Editorial and advertising offices, 386 Fourth Avenue, New York 16, N. Y., U. S. A. Entered as second-class matter October 5, 1889, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription, United States and Mexico, $3.00 per year; all other countries, $4.00; single copies, 35 cents.



SELECTION of the right type of Hycar synthetic rubber with the right compounding assures you the best combination of desired properties in the finished product.

Compounds of Hycar OR-15, other than pure gum, are equal or superior to those of any other synthetic rubber and approach those of natural rubber in tensile strength, elongation and modulus. They are extremely resistant to petroleum products and withstand the aromatic hydrocarbons found in many high octane gasolines.

Hycar OR-25 compounds remain flexible and serviceable at temperatures as low as —65° F. and also have good resistance to oils, solvents and the effects of heat. Further, Hycar OR-25 can be compounded to obtain very low compression set and high resilience, without undue sacrifice of other properties.

Compounds of both Hycar OR-15 and OR-25 have exceptional resistance to heat, abrasion and age. Further, both materials may be blended with vinyl resins to produce stocks which can be exposed to direct sunlight without checking or deteriorating.

Hycar OS-10 is very useful as a replacement for natural rubber in many special applications where oil resistance is not required. Compounds of OS-10 excel those of natural rubber in resistance to the effects of heat, abrasion and age, and are equally good in electrical resistivity and compression set.

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubber

Speed Up your synthetic rubber processing with:

PHILBLACK A

The new and unique HMF type black that imparts several extremely desirable advantages which both reduce processing time and improve the quality of the treated rubber.

- EXCELLENT PROCESSING
- LOW HYSTERESIS
- IMPROVED RESISTANCE TO CUT AND CRACK GROWTH

The properties and advantages of this new and different type black are completely presented in a new booklet "PHILBLACK A". Write or wire for this booklet, prices, availability, and samples.

PHILLIPS PETROLEUM COMPANY
Philblack Division

FIRST CENTRAL TOWER • AKRON, OHIO

Have you provided for OLD-AGE INSURANCE for your Synthetic Rubber Compounds?

One way to obtain this insurance is by the proper choice of secondary accelerators in the original compound. Let us suggest the use of

NAUGATUCK ALDEHYDE-AMINES

in combinations with thiazoles or thiurams

- Fast Cures
- Higher Tear Resistance
- Less Elongation Loss
- Safe Processing

BEUTENE—HEPTEEN BASE—
TRIMENE BASE

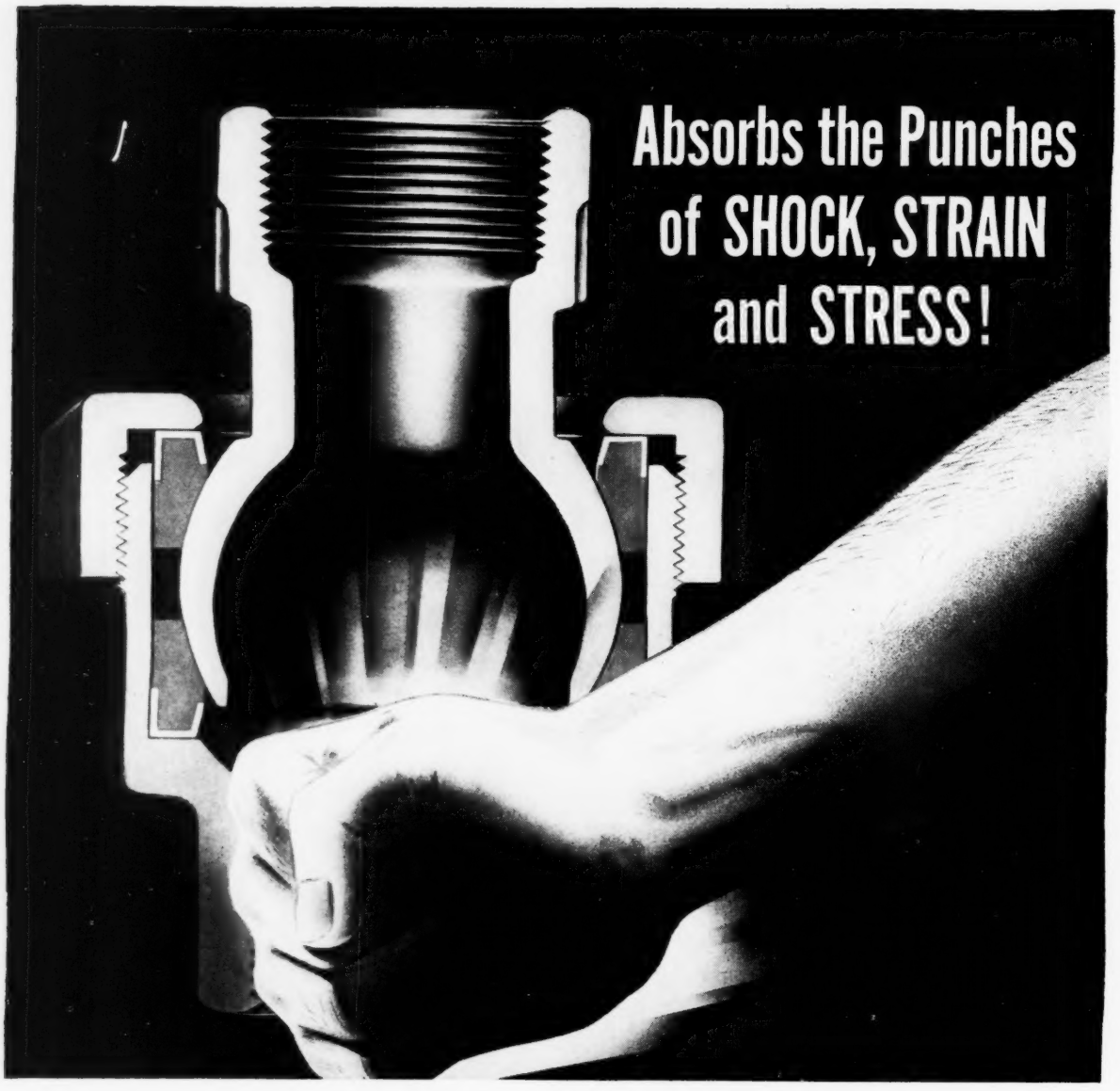
PROCESS...ACCELERATE...PROTECT...

with NAUGATUCK CHEMICALS

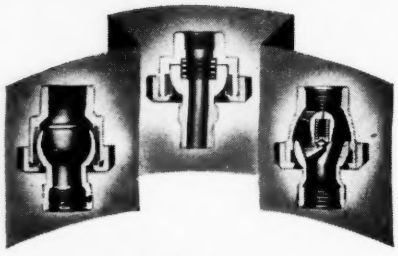
Naugatuck Chemical

DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK 20, N. Y.

IN CANADA: *Naugatuck Chemicals Limited, Elmira, Ont.*

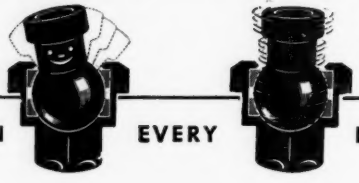


Barco Joints stop the damaging effects of vibration, contraction and expansion by compensating for all movements. For over thirty years engineers and maintenance supervisors have specified Barco Flexible Joints in jobs where flexible connections have been required to take care of *movement* or to absorb *vibrations* and *strain* in the transmission of steam, air, oil, water, and other fluids and gases. Our engineering department is available to you to help work out any Flexible Joint problems. Barco Manufacturing Company, Not Inc., 1810 Winnemac Avenue, Chicago 40, Illinois.



BARCO FLEXIBLE JOINTS

Not just a swivel joint...but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.



"MOVE IN EVERY DIRECTION"

The
GOODYEAR RESEARCH LABORATORY

Recommends

CHEMIGUM

THE OIL-RESISTANT SYNTHETIC
WITH SUPERIOR PROCESSING QUALITIES

For all military and aeronautical rubber products where impermeability to aromatic gasolines and oil, or pliancy at extreme sub-zero temperatures, is essential — The Goodyear Research Laboratory recommends CHEMIGUM. More than 20 years of development work—with synthetic rubber patents awarded to Goodyear in 1927-1929 — went into CHEMIGUM. That is why this Goodyear synthetic has demonstrable superiority in processing. For complete information concerning applications and methods, tested and proved in the world's largest rubber research laboratory, write Goodyear, Akron 16, Ohio.

Chemigum (pronounced Kem-e-gum) —T.M. The Goodyear Tire & Rubber Company

GOODYEAR

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WAR BONDS
BUY
FOR KEEPS

THE GREATEST NAME IN RUBBER

Photo Courtesy B. F. Goodrich Co.

PELLETEX and GASTEX

Speed Victory in Bogie Wheels of Half-Tracks . . . . .

To combat the harsh service which half-tracks undergo in war transportation, bogie wheels are surfaced with a rubber compound loaded with PELLETEX. Front wheels are also tired with PELLETEX and GASTEX compounds, while similar compounds containing these world famous semi-reinforcing blacks are used in engine mountings, fan belts, ignition cables, waterproof coverings, gas masks and numerous other parts and accessories.

Keep in mind for post war products the unique and invaluable properties of PELLETEX and GASTEX.

HERRON BROS. & MEYER

OHIO BLDG., AKRON, OHIO.

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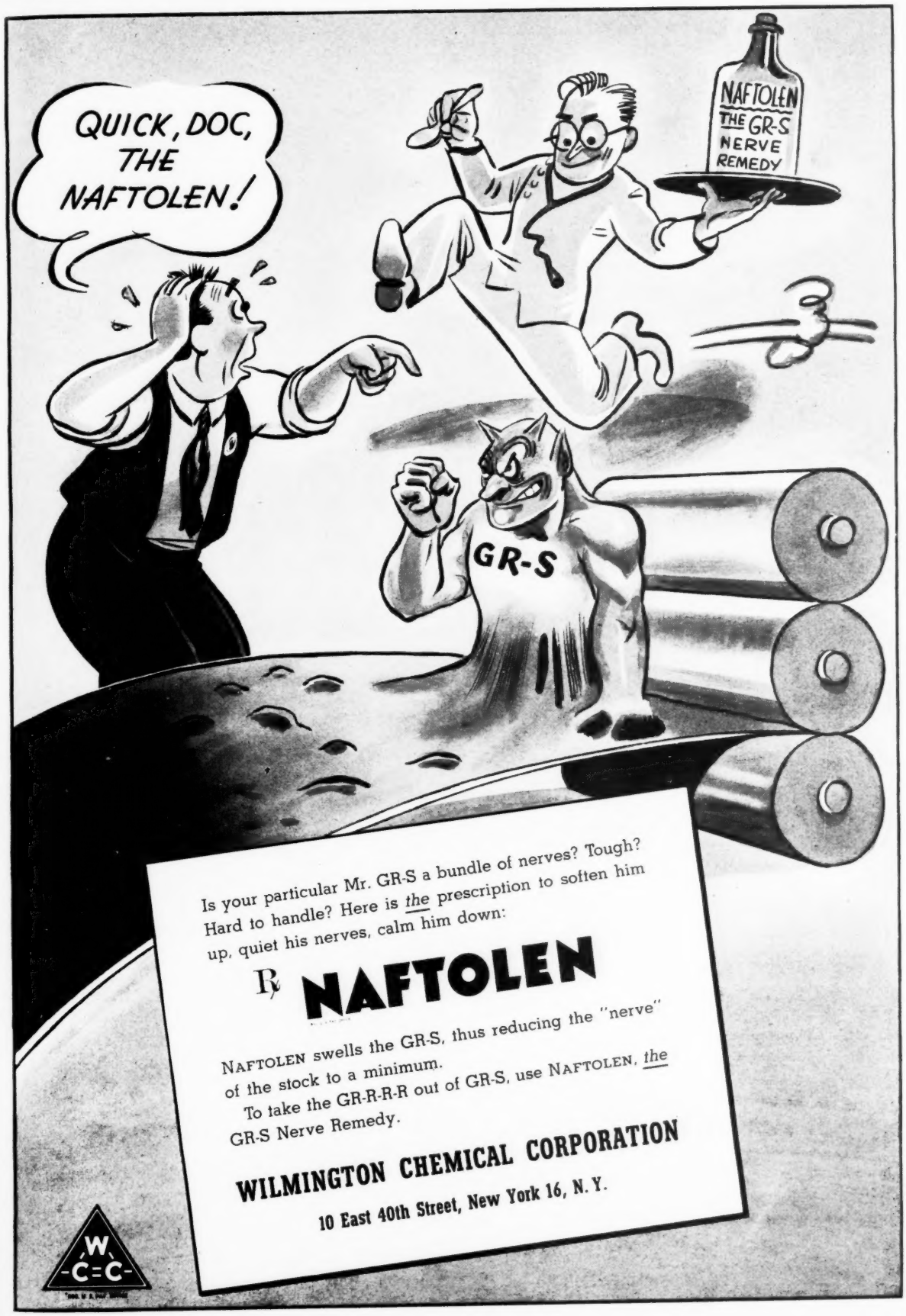


Is your particular Mr. GR-S a bundle of nerves? Tough? Hard to handle? Here is *the* prescription to soften him up, quiet his nerves, calm him down:

℞ **NAFTOLEN**

NAFTOLEN swells the GR-S, thus reducing the "nerve" of the stock to a minimum.

To take the GR-R-R-R out of GR-S, use NAFTOLEN, *the* GR-S Nerve Remedy.

WILMINGTON CHEMICAL CORPORATION

10 East 40th Street, New York 16, N. Y.

W C=C

Compounders: Send for Free New Data

SILENE EF AND CALCENE T

Two new reports from Columbia laboratories of interest and importance to rubber compounders working with GR:S.

The first shows how the physical properties of non-black stocks can be varied through a considerable range of modulus by varying ratios of Silene EF and Calcene T.

The second shows results obtained with 40 volumes of Silene EF with several different accelerations and the effect of varying sulfur level with one accelerator.

Write for Columbia Pigment Data Sheets No. 43-5. There is no charge.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING, PITTSBURGH 19, PENNSYLVANIA

Chicago • • • Boston • • • St. Louis • • • Pittsburgh • • • New York • • • Cincinnati
Cleveland • • • Minneapolis • • • Philadelphia • • • Charlotte

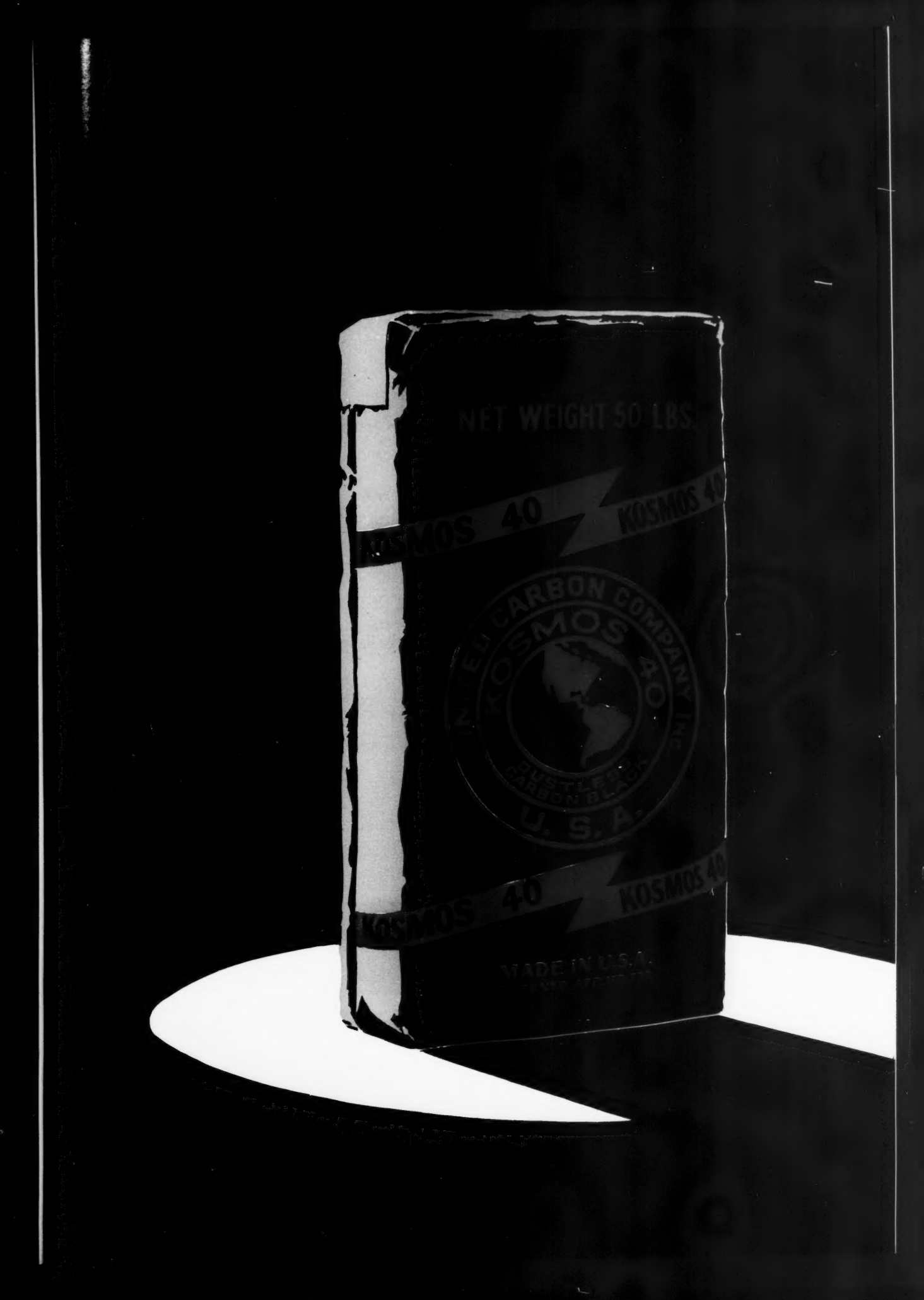
DO YOU HAVE NEW PRODUCTS which you believe will interest us? One of the important members of our Purchasing Staff is a chemical engineer who directs the testing of new materials and who sees that new ideas are thoroughly investigated. If you have new products or services of the type we might use, bring them to the attention of our Purchasing Engineer, Barberton, Ohio. Full consideration is assured.

THE SAME GREAT STRATA of salt under its Barberton, Ohio, plant furnishes brine for the DPC plant operated by Columbia at Natrium, W. Va. At Barberton, however, the salt bed is only 2,800 feet below the surface, compared to the 6,720 foot depth which makes the Natrium deposit the deepest in the world in commercial use. The bed is 120 feet thick at this point.

A STRIKING EXAMPLE of the growth of the chemical industry is found in the production records of Caustic Soda. In 1899—the year of Columbia's organization—total U.S. production of this chemical was 167,000 tons. By 1941—before the impetus of our nation's war needs—the chemical industry itself was consuming 220,000 tons of the total national production of 1,095,000 tons, and Columbia's Caustic Soda output alone exceeded the total 1899 production by a substantial margin!

A TOTAL OF 908 Columbia employees are now with the armed forces. And 100% of those who are keeping Columbia going at top speed are backing up their buddies with War Bond subscriptions. We hope your own organization is also Backing the Attack to the very limit.

COLUMBIA CHEMICALS include Soda Ash, Caustic Soda, Sodium Bicarbonate, Liquid Chlorine, Silene EF (Hydrated Calcium Silicate), Calcium Chloride, Soda Briquettes, Modified Sodas, Caustic Ash, Phosflake, Calcene (Precipitated Calcium Carbonate), and Calcium Hypochlorite.


NET WEIGHT 50 LBS.
KOSMOS 40
KOSMOS 40
CARBON COMPANY INC.
KOSMOS 40
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KOSMOS 40
KOSMOS 40
MADE IN U.S.A.

KOSMOS 40

This latest furnace-process reinforcing carbon black (HMF type) for synthetic and natural rubber possesses a combination of most desirable characteristics—

- cool mixing
- easy processing
- smooth and rapid extrusion
- fast rate of cure
- full reinforcement
- low heat build-up
- high resiliency
- high resistance to cut growth, flex cracking and abrasion.

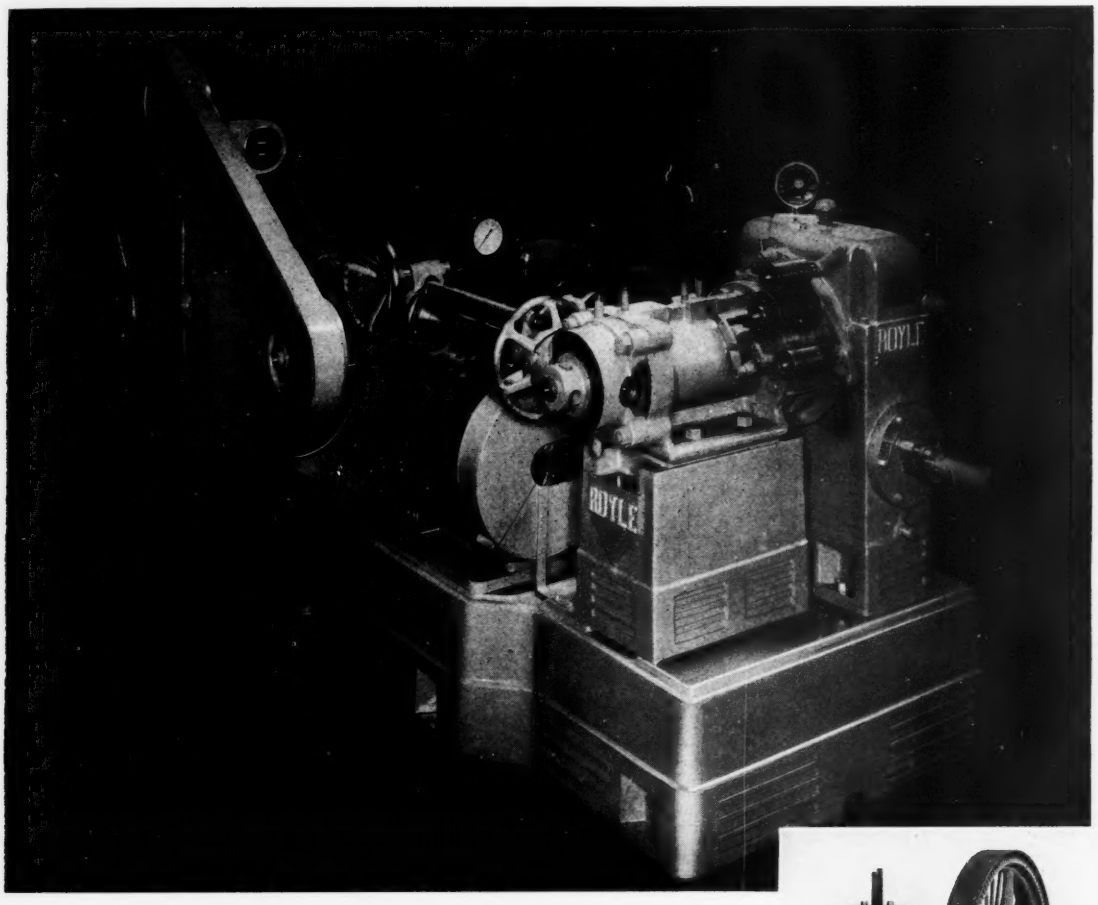
Kosmos 40 is especially useful for tires of all types, pneumatic or solids, under any conditions; tubes, bogie wheels; footwear; and mechanical goods.

Try a 50-50 blend of Kosmos 40 and channel black for tread stock to secure better plasticity. It will make it possible for you to dispense with one milling and thus—which is so important now—INCREASE YOUR OUTPUT.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston, West Virginia



No. 2 Royle Continuous Vulcanizing Machine equipped with Stock Screw Speed Tachometer and Sperry Exactor Control.

Extruding in 1944 with a 1905 Royle Tubing Machine

Yes, it is being done. Not in one isolated plant but in many where ingenuity has been substituted for modern machines. These processors have done a grand job in literally interpreting "make it do."

Essentially the continuous extrusion process hasn't changed a great deal since John Royle & Sons first introduced it sixty-four years ago. There have been refinements — the most apparent being in the field of temperature control and in the development of accessory equipment.

When the war has been won these "turn of the century" tubers will be retired for modern machines. The post-war Royle Extruder probably won't be a startling revelation. Into it will go all of the "know how" gained from pioneering in the continuous extrusion machinery field since 1880.

No. 2 Royle Tubing Machine of 1905

JOHN ROYLE & SONS

ROYLE PATERSON N. J. 1880

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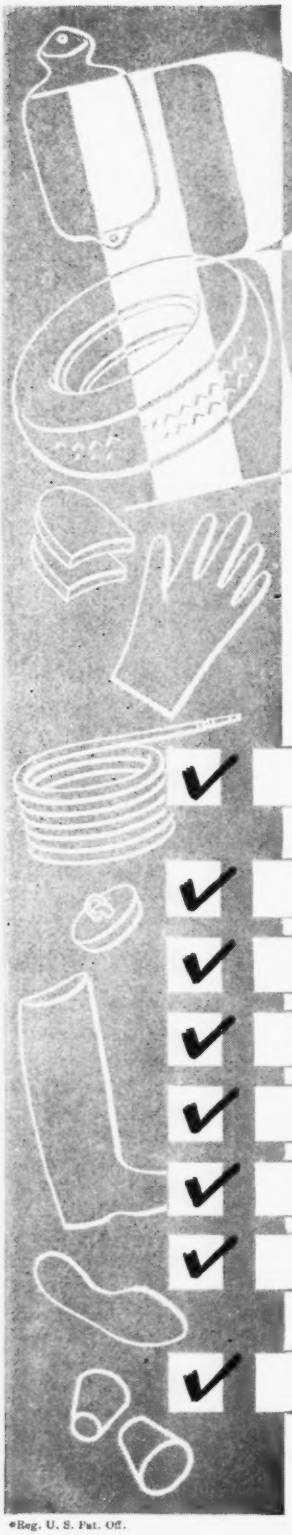


Bardol* in GR-S

FOR FOOTWEAR, MECHANICALS AND OTHER MOLDED, CALENDERED AND EXTRUDED GOODS.

Check your rubber compounding needs to see how Bardol can help you.

- ☑ An effective softener and plasticizer.
- ☑ Aids in wetting fillers and promoting dispersion.
- ☑ Improves calendering and operating conditions.
- ☑ Insures better adhesion in friction stocks.
- ☑ Effective (with Cumar*) in producing superior footwear uppers.
- ☑ Contributes to maximum tack when used with special tackifying agents.
- ☑ Lessens shrinkage and provides smoother processing in extruded GR-S reclaim stocks when used with Carbonex S*.

*Reg. U. S. Pat. Off.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
The Barrett Company, Ltd., 5551 St. Hubert St., Montreal, Que.

Barrett

ONE OF AMERICA'S GREAT BASIC BUSINESSES

Active service pays off!

Crown engineers' field-experience in adapting Crown Zippers to meet special military jobs will pay big postwar dividends to you!

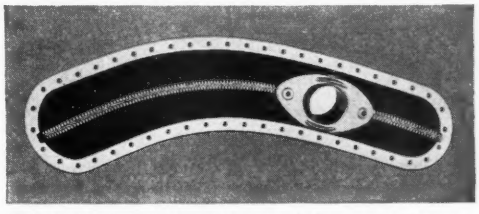
When this war started, Crown Zipper engineers went right out into the field with our armed forces to develop zippers for tents, sleeping bags, aircraft covers, and countless other military items.

Crown engineers were also called on to *redesign* hundreds of existing closure applications—and out of this experience came some of the most amazing developments in zipper history.

Today there's a Crown Zipper that actually slides freely around curves—a zipper with *ten* sliders on one track, providing smooth closures in both directions—zippers that are big and tough, yet easy to operate—zippers that are small and dainty, yet virtually indestructible! (See list of Crown superiorities below.)

When the war is over, Crown's tremendous backlog of experience will prove invaluable to rubber manufacturers. For our designers will be able to sit down with your designers and adapt—or, if necessary, *create*—special Crown Zipper features to meet special jobs.

Remember, when *you* turn to postwar planning: Crown Zipper designs aren't frozen—Crown adapts the zipper to the job.



NEW "Double-Acting" Crown Zipper on airplane gun turrets opens ahead of gun, closes behind it, protecting gunner from cold.

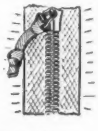
CROWN ZIPPERS are 5 ways better

1. Takes sharp curves

2. Die-cast for smoother action—extra strength

3. Provides opening wherever you want it

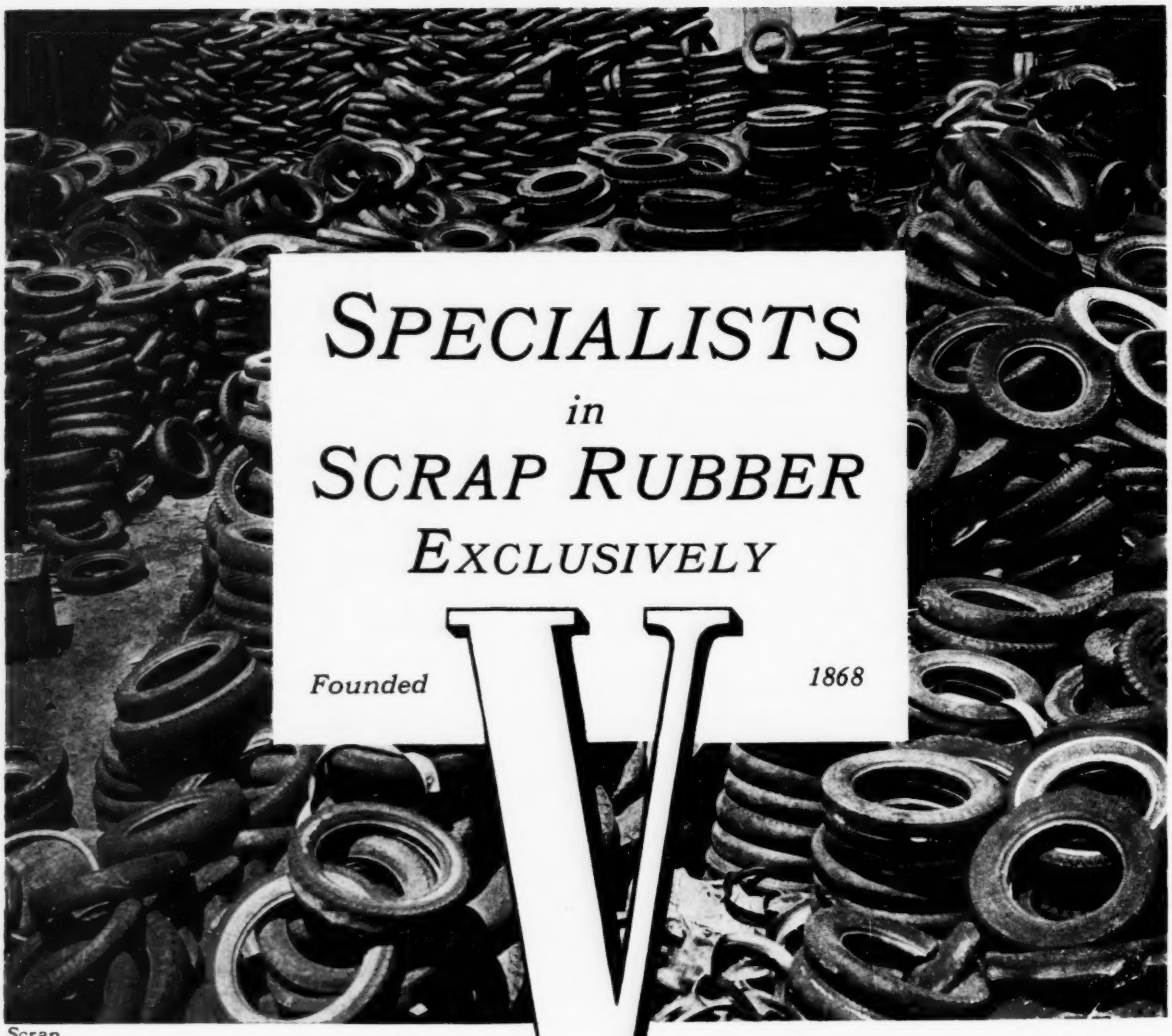
4. Won't lock open



5. Resists corrosion

Member of the J. & P. Coats • Clark's ONT *Family*

THE SPOOL COTTON COMPANY • *745 Fifth Avenue, New York, N. Y. (Crown Fastener Division)*



Where the middleman serves a VITAL PURPOSE

The collecting, proper sorting, classifying and distribution of scrap rubber is a highly specialized business and our lengthy experience in the handling of scrap rubber *exclusively* qualifies us to do the job with accuracy and dispatch.

Our organization is at your service.

THE LOEWENTHAL CO.

JACK SIDER, President — J. K. McELLIGOTT, Exec. Vice-Pres.

"Jack and Mac Are Here to Serve You"

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CABLE ADDRESS: "GYBLOWELL"

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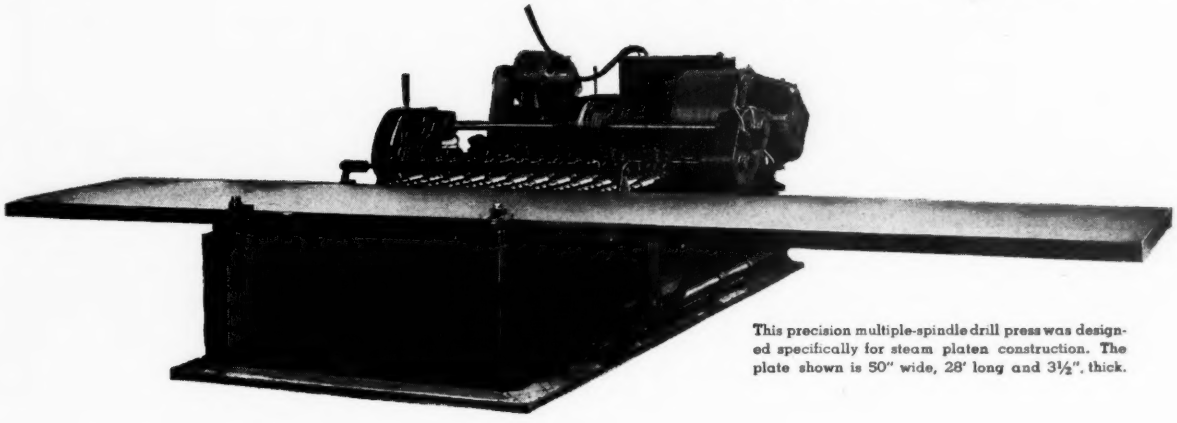
3 Reasons why
R. D. WOOD STEAM PLATENS
are trouble-free . . .



This precision multiple-spindle drill press was designed specifically for steam platen construction. The plate shown is 50" wide, 28' long and 3½", thick.

1. UNIFORM HEAT DISTRIBUTION . . .

holes are drilled on a special horizontal multiple-spindle drill press that insures straightness, accurate center line location and uniform spacing.

2. ACCURATELY-MACHINED SURFACES . . .

plate thicknesses are uniform throughout the entire plate area. Surface can be finished as required from ordinary smooth tool finish to a highly polished surface.

3. PERMANENTLY STEAM-TIGHT . . .

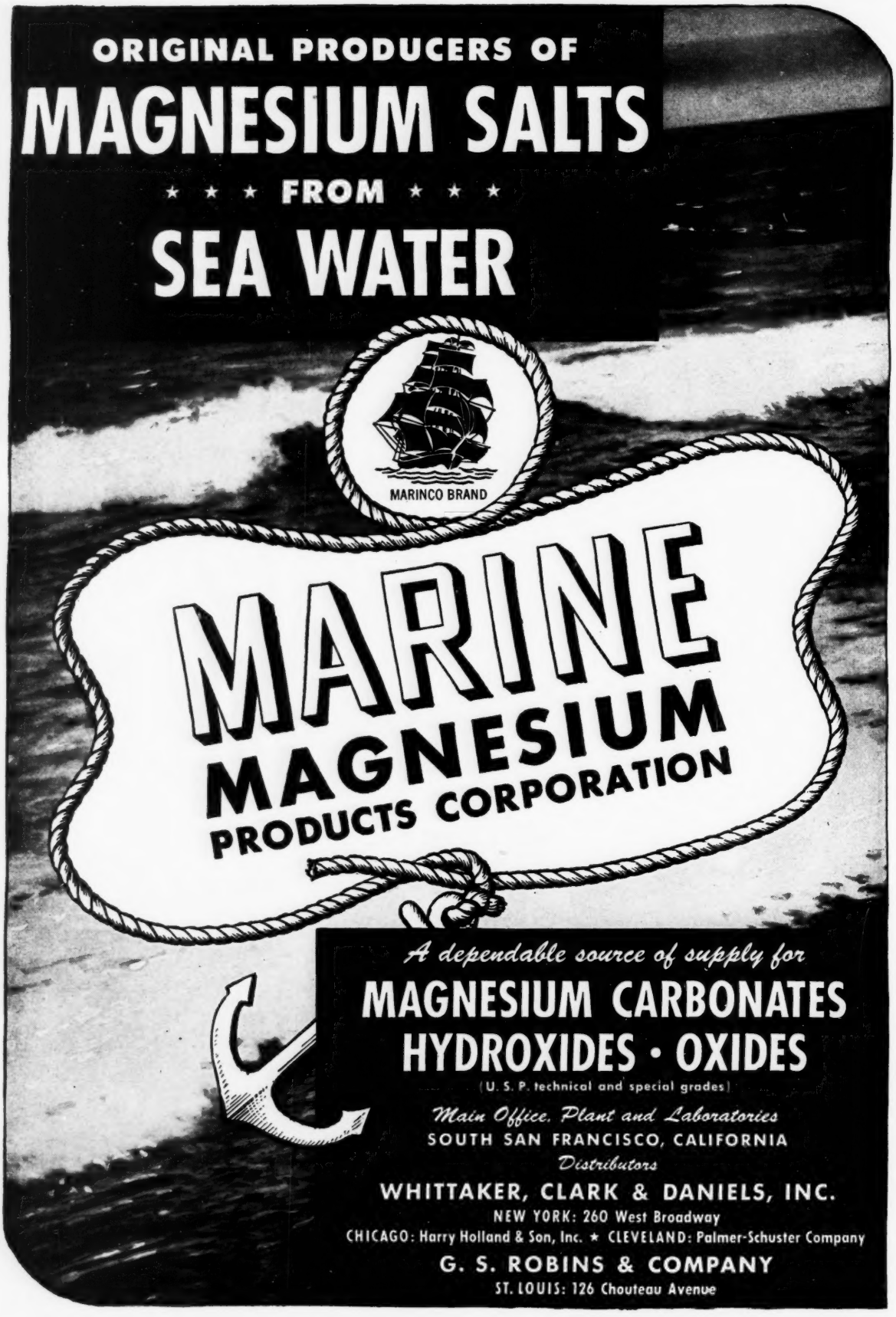
welded plug construction eliminates the need for threaded joints. Prevents leakage under even the most severe operating conditions.

If you have need for steam platens or hot plates of any size, shape or thickness, it will pay you to consult with R. D. WOOD engineers. Our facilities for and experience in steam platen construction covers the rubber, plastic, wallboard and many other fields. Write us today about your steam platen problems.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE . . .

R. D. WOOD CO.

400 CHESTNUT ST. PHILADELPHIA 5, PA.


ORIGINAL PRODUCERS OF
MAGNESIUM SALTS
★ ★ ★ FROM ★ ★ ★
SEA WATER
MARINCO BRAND
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MAGNESIUM
PRODUCTS CORPORATION
A dependable source of supply for
MAGNESIUM CARBONATES
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(U. S. P. technical and special grades)
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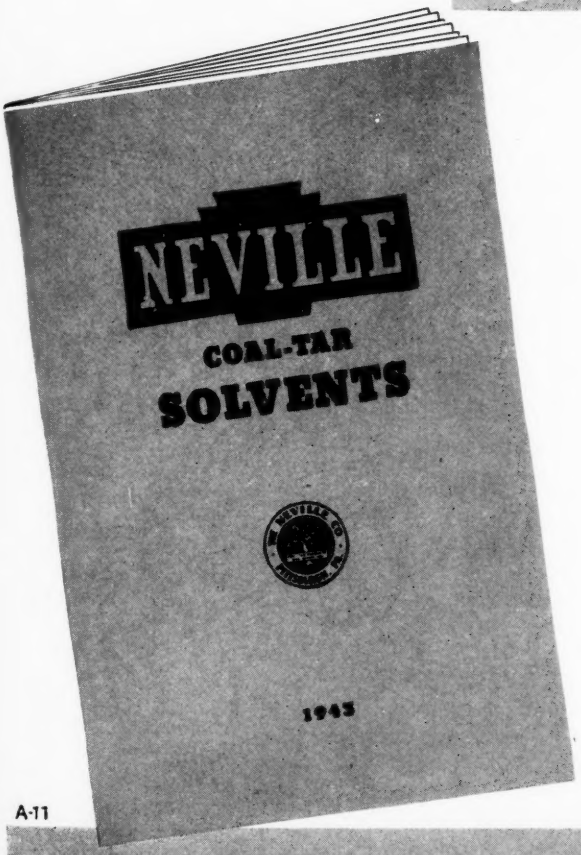
NEVILLE Solvents



Experience has proved that coal-tar solvents are the most desirable for many difficult solvent problems. Neville has developed not only uniformly excellent solvents of standard distillation ranges, but also a number of new fractions. Neville offers a complete range of Coal-Tar Solvents to meet the widely varying requirements of Industry.

The grades, specifications and uses of these versatile solvents are fully described in this 40-page booklet. Write for your copy today.

A-11

THE NEVILLE COMPANY

PITTSBURGH · PA.

Chemicals for the Nation's War Program

BENZOL • TOLUOL • XYLOL • TOLLAC • NEVSOL • CRUDE COAL-TAR SOLVENTS
HI-FLASH SOLVENTS • COUMARONE-INDENE RESINS • GUANADINE NITRATE • TAR PAINTS
RUBBER COMPOUNDING MATERIALS • WIRE ENAMEL THINNERS • DIBUTYL PHTHALATE
RECLAIMING, PLASTICIZING, NEUTRAL, CREOSOTE, AND SHINGLE STAIN OILS

Is BUNA "S" slowing your production and increasing your costs because:—

1. It produces excessive shrinkage?
2. It resists compound dispersion?
3. It lacks tack?
4. It overloads equipment?

If so you are working under a handicap as competitors have met these enemies with:—

"SUPER-TAC"

Plasticizer——————Tackifier

A trial will convince you.

GALEY MANUFACTURING COMPANY

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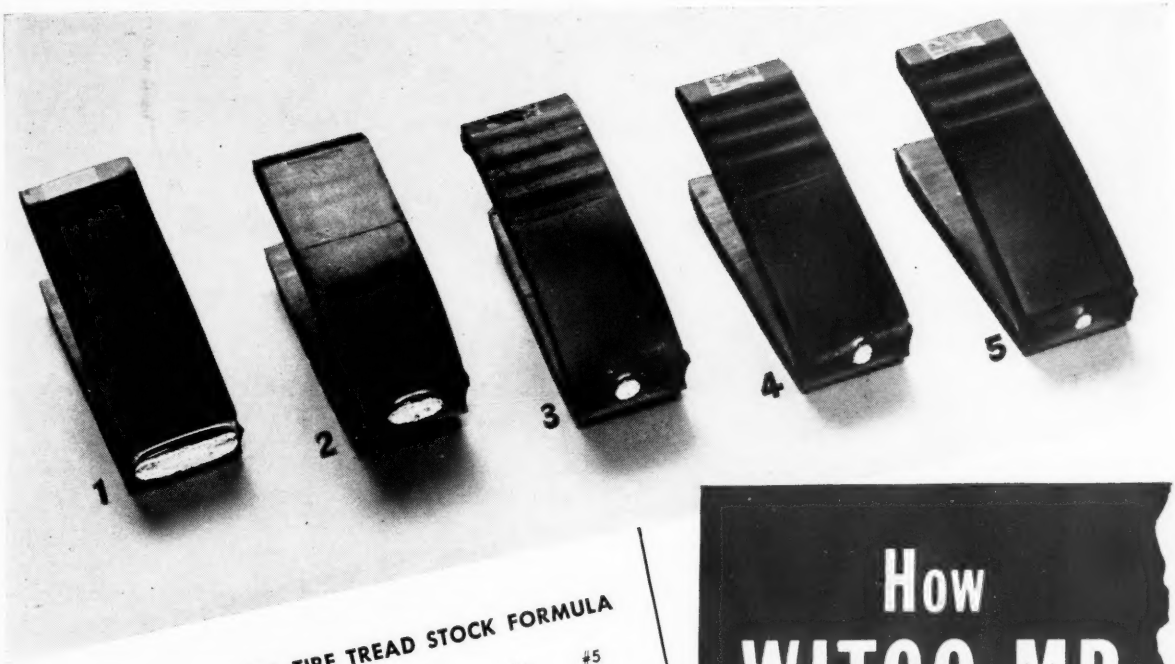

How WITCO MR INCREASES FLEX CRACK RESISTANCE IN GR-S

WITCO M. R. IN TYPICAL TIRE TREAD STOCK FORMULA

Parts by Weight	#1	#2	#3	#4	#5
GR-S	100.	100.	100.	100.	100.
Zinc Oxide	5.	5.	5.	5.	5.
Stearite	2.	2.	2.	2.	2.
Mercaptobenzothiazole	1.5	1.5	1.5	1.5	1.5
Sulfur	2.	2.	2.	2.	2.
Witco #12 Channel Black	50.	50.	50.	50.	50.
Witco #38 M. R.	0.	10.	20.	30.	40.
Width of Crack after 19,000 Flexing Cycles (in centimeters)	2.3	1.1	0.67	0.42	0.34

In order to more clearly illustrate the relative extent of the cracks in the various samples, each was dusted with a white pigment.

The photograph tells the story. Reading from left to right, each sample tested graphically illustrates the effect of added amounts of Witco M. R. (Hydrocarbon) on the flex crack resistance of a typical GR-S tire tread stock formula.

In the tests conducted at Witco's research laboratory all the samples were flexed simultaneously. After 19,000 flexing cycles the width of the resulting cracks decreased from 2.3 centimeters to .34 centimeters, as additional amounts of Witco M. R. were used. (See Table.)

But the tests revealed additional advantages, too, of Witco M. R. It makes the uncured stock more plastic and therefore easier to process; increases tensile strength and tear resistance; decreases the effect of aging on lowering tensile strength; lowers elongation and hardens the uncured stock; decreases modulus and resilience.

You will find Witco M. R. well worth investigating in your own processing. Write for samples or talk it over with one of our technical representatives.

WITCO CHEMICAL COMPANY MANUFACTURERS AND EXPORTERS

[FORMERLY WISHNICK-TUMPEER, INC.]

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Progress Report...
ON Continental's
NEW FURNACE BLACK PLANT
Unit Production Already Under Way...
Factory Batch Samples Now Available
Construction of Continental's new plant, designed specifically for highly efficient, rigidly controlled production of the new Continental Perfected Furnace Blacks, is now nearing completion at Sunray, Texas.
Already, factory batch samples of CONTINEX SRF, first in the line, are available for testing purposes as the first units go into production. This semi-reinforcing black of the furnace type offers strength and loading capacity plus higher rebound resilience and longer service life.
Production of Continental's new line will soon be started at full plant capacity. Meanwhile, write to the nearest Witco Chemical Company office for your working samples of
CONTINEX SRF
[Semi-Reinforcing Furnace Black]
CONTINENTAL CARBON COMPANY
MANUFACTURER
[CONTINENTAL CHANNEL AND FURNACE BLACKS]
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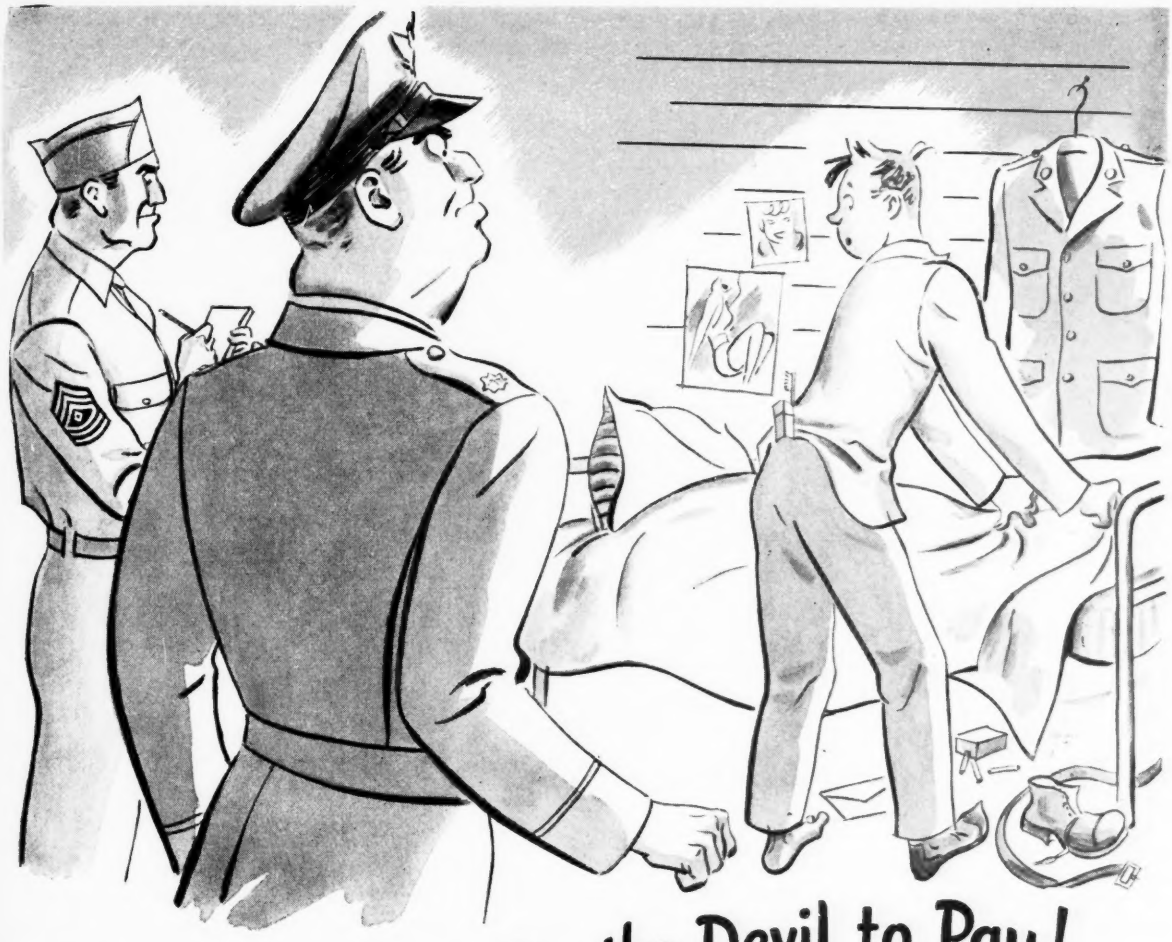

There's Going to Be the Devil to Pay!

Yes—and there's the devil to pay in your plant if lack of uniformity in solvents throws the whole production line out of gear.

But—you can avoid that headache by specifying SKELLYSOLVE. A given type of SKELLYSOLVE ordered tomorrow, or any time, will be identical in characteristics with that same type ordered now. SKELLYSOLVE means dependable uniformity, because, in refining it, we depend on *accurate, scientific, instrumented quality control.*

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RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

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SKELLY BLDG., KANSAS CITY, MO.

The V-Belt that lives up to its name

THERE'S a new reason for calling them . . . V-belts. For the "V" now symbolizes victory over the chief causes of ordinary V-belt failures that at one time gave Army engineers many a headache.

These new type V-belts have to meet severe service driving the generators, fans, fuel and water pumps in armored tanks. Ordinary fan belts with cotton cords couldn't stand up under the high temperatures generated by high-powered tank engines. The extreme heat caused cotton cords to stretch, engines overheated—often resulted in stalling—and the higher the heat, the shorter the life of the belt.

To meet Army requirements that V-belts should perform satisfactorily for the life of the engine, various types and construction of reinforcing cable were tried. But none proved entirely satisfactory until National-Standard's engineers, long experienced in developing and combining fine wire with rubber, licked the problem. The wire had to be suitable for stranding with high uniformity—any twist would tend to make the belt twist . . . providing maximum adhesion to rubber was highly essential.

How well National-Standard helped leading V-belt manufacturers meet Army specifications is evidenced by the additional use of these belts for many trucks and gun carriers.

Similar type V-belts are used for power transmission drives — longer life—accurate and more permanent fit permits the use of fewer belts per driving unit. Wire reinforcement has eliminated excessive stretching in conveyor belts too, made possible heavier loading, longer life and great economy.

This is typical of National-Standard's service to all industry—perhaps this research and engineering skill can be utilized to improve your products. Why not write and find out?

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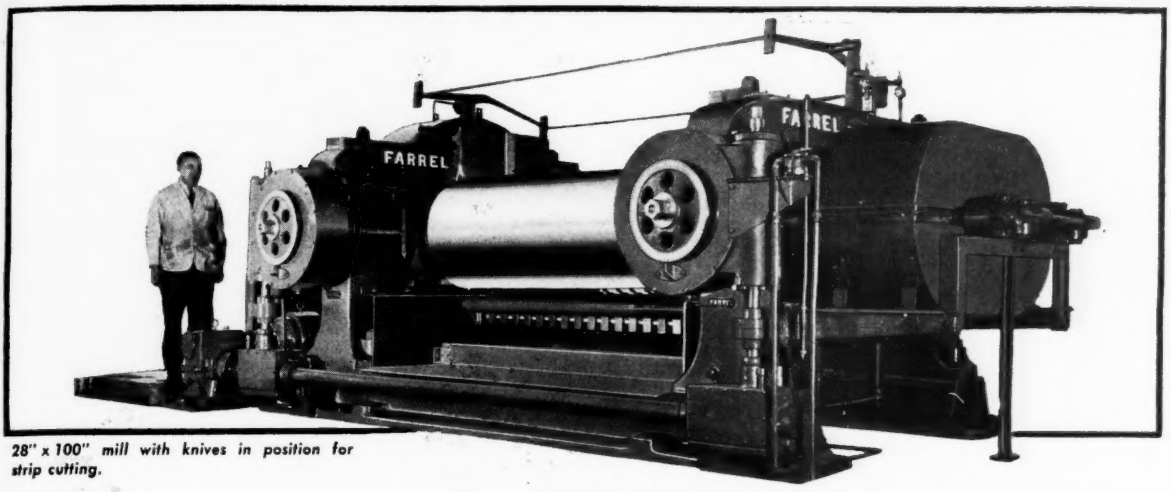
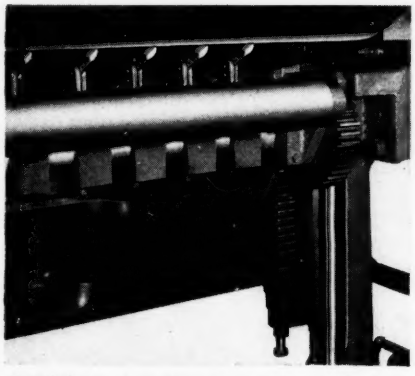


28" x 100" mill with knives in position for strip cutting.

NEW 100-INCH MILL FOR HOT-WORKING GRI

Probably the largest ever built, either here or abroad, this huge 28" x 100" mill is designed for two distinct jobs.

During the hot working part of the process a specially designed pan catches all particles falling from the rolls. When this operation has been completed, an air-controlled mechanism folds back the pan and raises a series of calender-type knives into position. The knife assembly is designed so that practically any width and number of strips can be removed from the mill after the hot working operation has been completed. Scrapers can be substituted for the knives when required.



Detailed view of mechanism for raising and lowering the knife assembly. The pan was removed for this photo.

This is a good example of a Farrel "designed-for-the-job" mill. The rubber company wanted a machine which would be capable of solving their problems as they arose. Our engineers obliged with a design that included a number of features never before built into a mill of any size.

If you, too, are faced with the need for special machinery, we can probably help you. Our engineers will be glad to discuss your problems with you at any time.

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Banbury Mixers — Plasticators — Pelletizers — Mixing, Grinding, Warming and Sheeting Mills — Bale Cutters — Tubing Machines — Refiners — Crackers — Washers — Calenders — Hose Machines — Hydraulic Presses — and other rubber working equipment.

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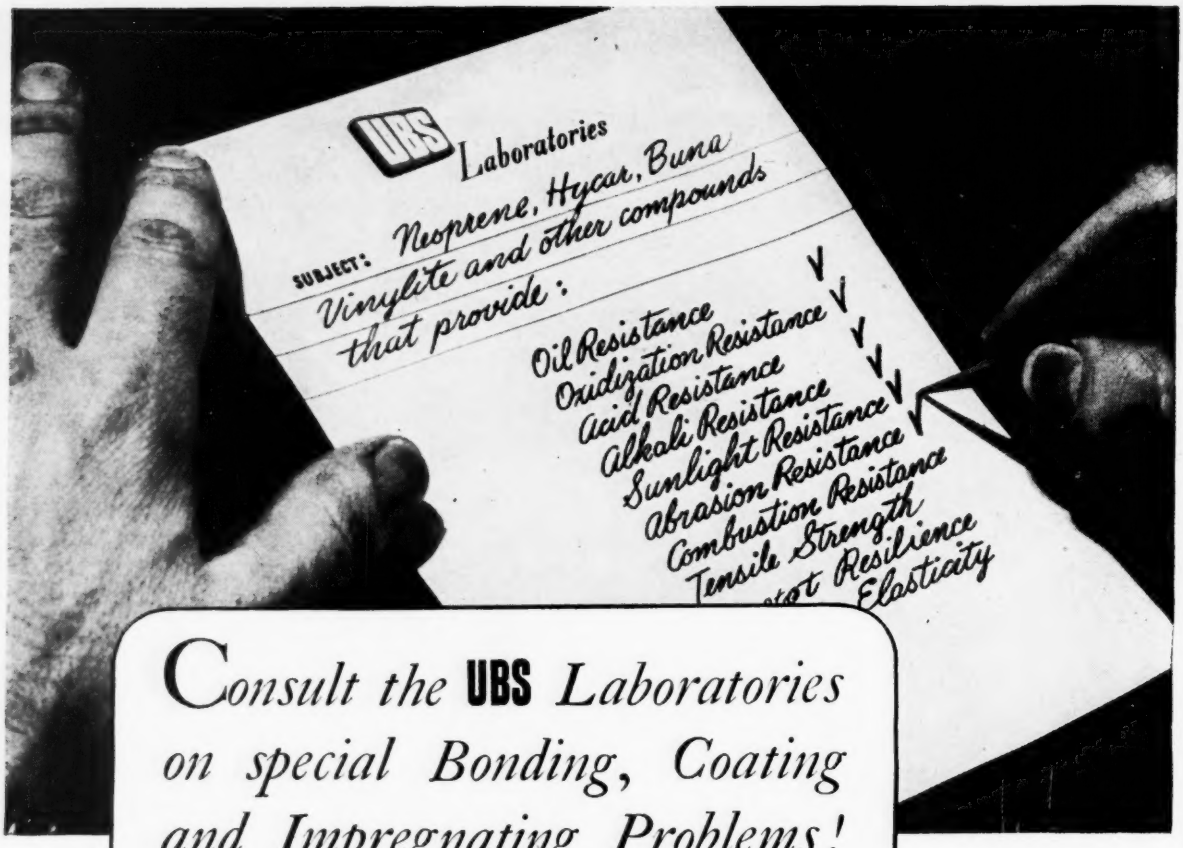

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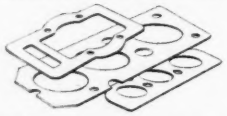
No matter what the problem may be — *bonding neoprene, rubber and other coated or moulded parts to any ferrous or non ferrous metal; corrosion proofing chemical tanks and equipment; laminating leather belting; coating magneto parts; combining or coating fabrics; impregnating paper; cementing various materials together; insulating wire and other articles; etc.* — you will find the UBS Laboratories equipped to provide the one best formula to suit your needs. Longtime specialists in the field of industrial Bonding, Coating, and Impregnating Compounds, the UBS Laboratories not only know thoroughly the compounding advantages and limitations of all the latest synthetics, but even have developed an original synthetic latex and synthetic rubber of their own. *Write today, describing your Bonding, Coating, or Impregnating Problems.*

UBS developed adhesives are being used in the manufacture of inflatable Army and Navy Equipment, where weather and chemical resistant seams of high tensile strength are required.



UBS developed compounds are being successfully used to coat magneto parts and for cementing gaskets, where oil resistance is of great importance.

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UBS developed compounds are being used for chemical tank linings and to corrosion proof chemical handling equipment, where acid resistance and alkali resistance are primary factors.

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

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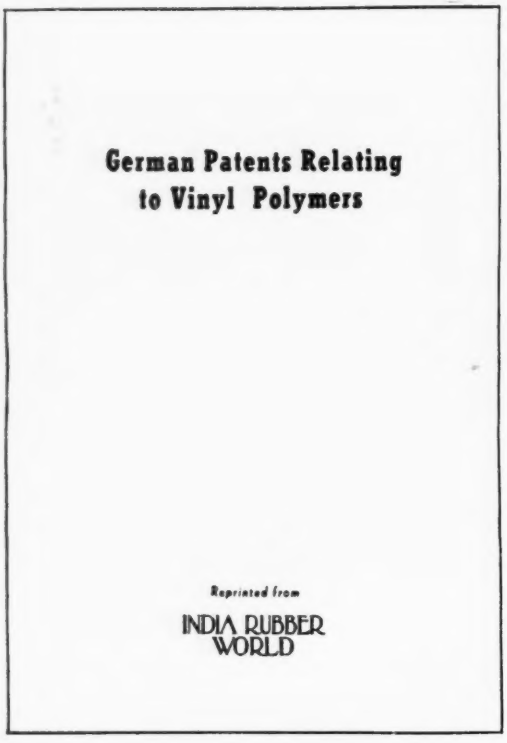

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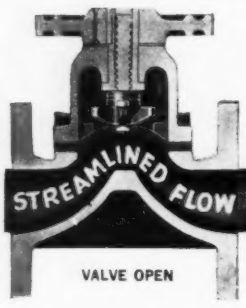

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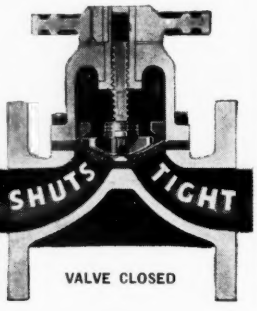

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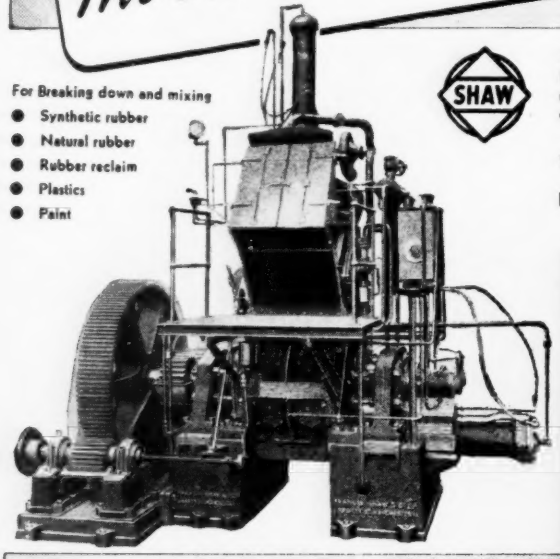

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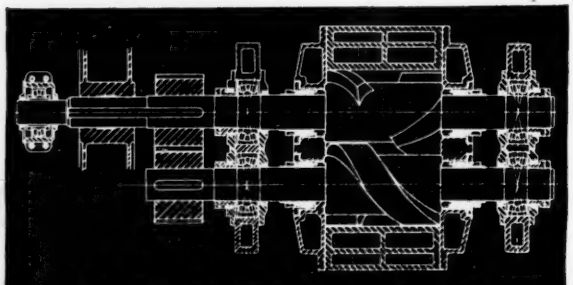

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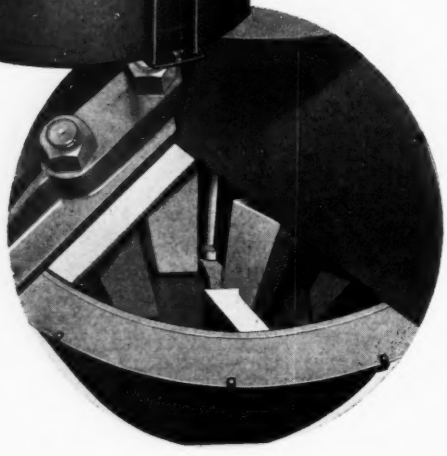

Interior View Showing Heavy Agitator Blades

The Day Hero Rubber Cement Mixer requires much less time for dissolving a batch than does the older type of mixer. Four sets of stationary blades, spaced at 90 degrees, extend downward from the top frame. Two sets of blades, spaced at 180 degrees, extending upward from heavy agitator arms located at the bottom of vertical shaft, rotate with the shaft.

The lower picture shows the blade section of the Day Rubber Cement Mixer, illustrating the close clearance between the stationary and the moving blades, which shear the rubber into smaller and smaller pieces, constantly exposing more surface to the action of the solvent.

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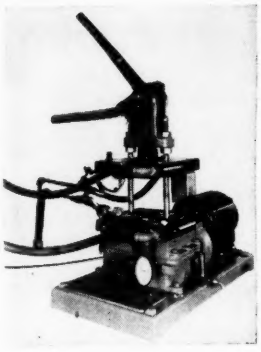

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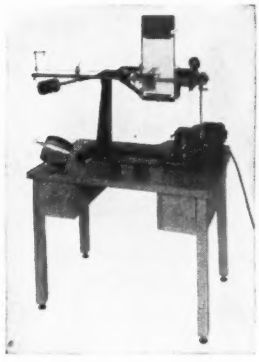

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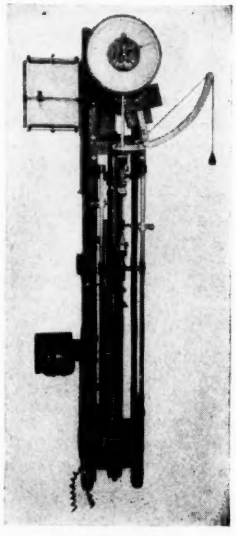

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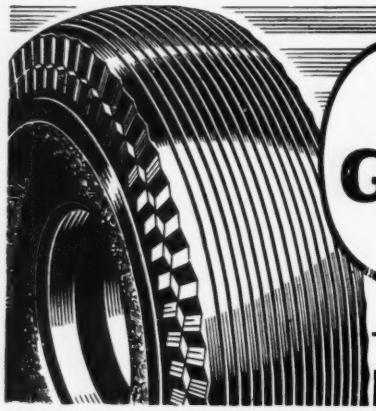

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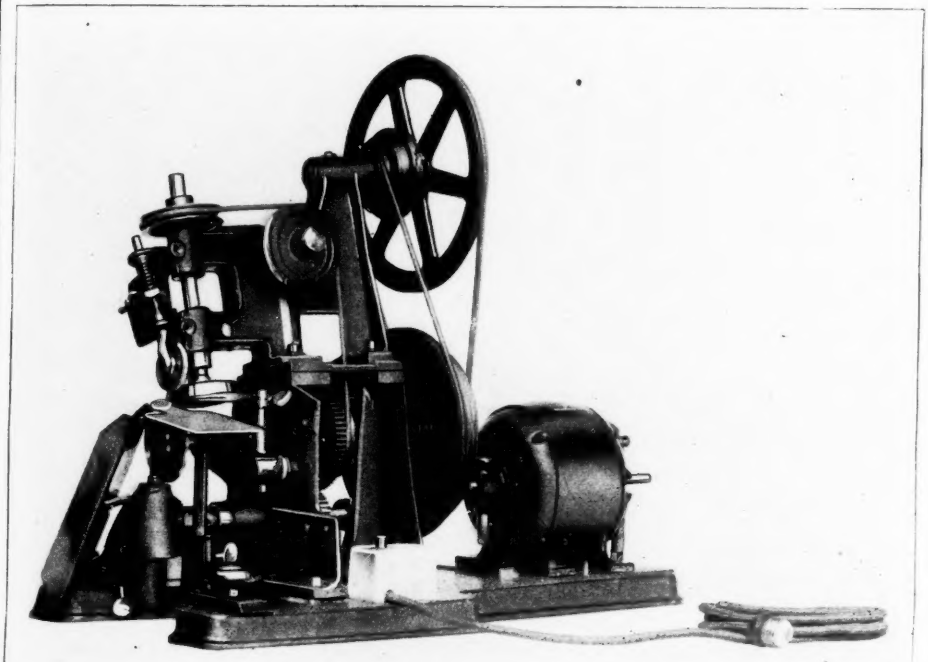

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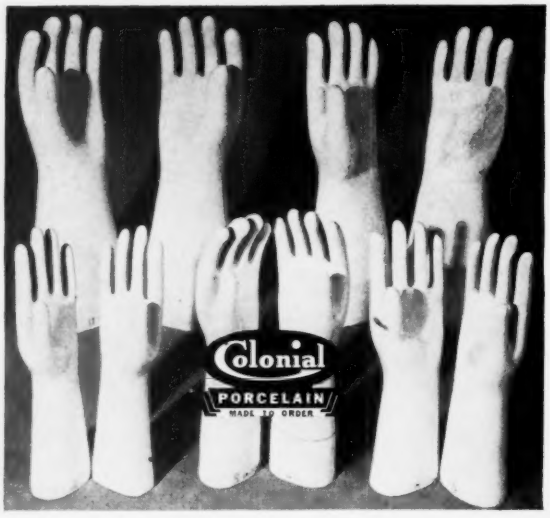

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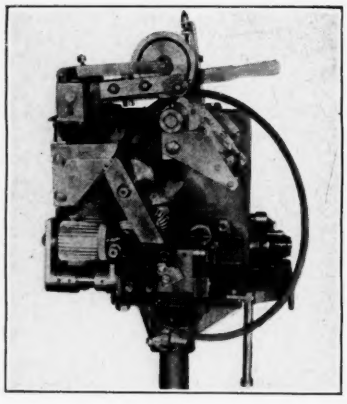

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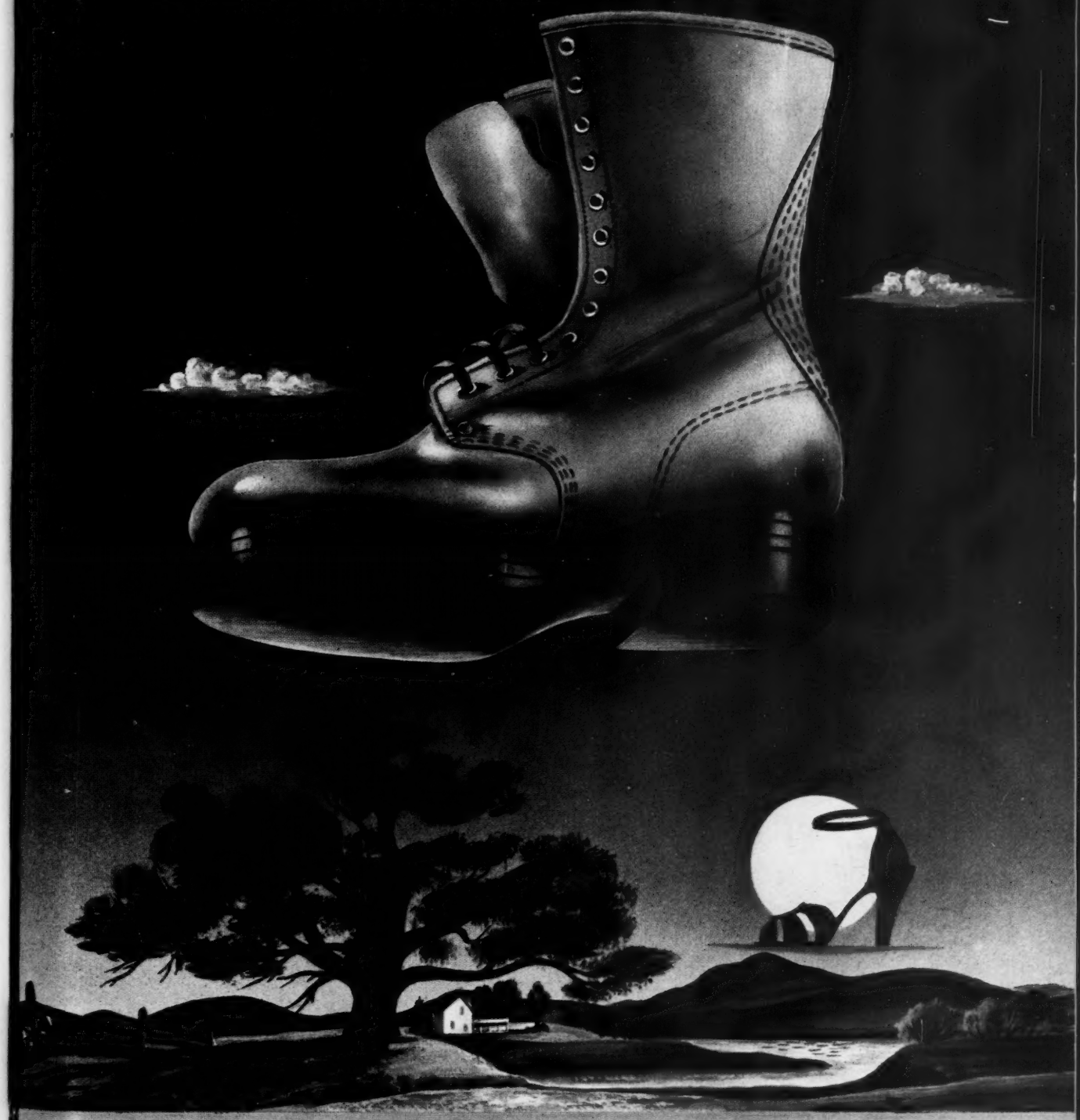

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May, 1944

Volume 110 Number 2

A Bill Brothers Publication

INDIA
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NATURAL & SYNTHETIC

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Volume 110 **New York, May, 1944** **Number 2**

The Use of Synthetic Rubbers in Molded Products[1]

M. J. Sanger[2]

THE old saying, "Necessity is the mother of invention", is particularly applicable to the use of synthetic rubbers in molded products. In the conversion to these materials we have been constantly confronted with the necessity of changing from one synthetic rubber to another. At the same time it was necessary to maintain quality standards along with factory production. Sometimes the results have been far more than anticipated. If we had been told before the conversion program on gas mask parts that it would be possible to produce these parts from Neoprene GN (GR-M) compounds in the same or shorter curing cycles then used on rubber compounds, we would have had difficulty in believing it. However, this has been accomplished. Many other molded products have been converted from natural rubber to synthetic rubbers although numerous problems have been encountered in the changeover. Some of these problems and the methods by which they were solved may be of interest to those who make and use rubber products.

Choice of Materials

One of the first difficulties encountered in the conversion program was that of indecision by both civilian and military consumers as to the type of materials desired for their products. This was due in part to inadequate knowledge of the properties of different synthetics, to changes in the availability of each, and to changes in government regulations. For instance one customer asked for samples of his complete line of products from reclaim, then neoprene, then maroon colored reclaim, and finally Buna S (GR-S). Each change involved a development project in itself. The result of such indecision has been the expenditure of a great deal of time and effort in development that could have been applied more advantageously elsewhere. One solution of this problem we feel is customer education. That is, if those who specify materials understand those materials and their properties, they will be better able to choose them intelligently. With this understanding, which we hope will be furthered by this symposium will come standardization and simplification of specifications. One of the most helpful steps would be the adoption of the A. S. T. M. Tentative Specifications for Rubber and Synthetic Rubber Compounds for Automotive and Aeronautical Applications (D735—43T), which were prepared by Technical Committee A on Automotive Rubber, of Committee D-11 on Rubber Products, functioning under the joint sponsorship of the American Society for Testing Materials and the Society of Automotive Engineers.

Compounding Limitations

Another problem involved in changing from natural to synthetic rubber in molded parts was that of the compounding limitations peculiar to synthetic rubbers. It has been found difficult and sometimes impossible to duplicate the wide range of properties to which we had become accustomed in natural rubber. For instance, a customer might ask for a synthetic rubber stock to duplicate a soft, pure-gum, high-quality natural rubber compound. A very soft GR-S stock would be out of the question as it would have very low quality. When the hardness of GR-M is reduced to duplicate a pure gum stock, serious processing problems are encountered. Usually a compromise is reached on a somewhat harder synthetic rubber compound of lower quality than the natural rubber stock. Resilience, which is relatively easy to obtain in natural rubber stocks, is quite difficult to duplicate in synthetic rubber compounds. Good low-temperature properties, which are common to most natural rubber compounds used in molded goods, are also difficult to obtain in synthetic rubber compounds, but the necessity of matching these rubber-like properties is often urgent and sometimes absolutely essential for certain service applications. This has called for invention and ingenuity on the part of rubber technologists.

The solution of the limitations in the compounding of synthetic rubbers has been accomplished by both individual and cooperative effort. Various technical committees have held regular meetings, pooled their technical information, and assisted each other in the conversion to synthetic rubber. This procedure, although quite unorthodox for the rubber industry, has greatly expedited the conversion program and has resulted in the use of relatively uniform compounds where they are desired. An example was the series of technical meetings on gas masks and component parts. Although many unforeseen difficulties were encountered incident to synthetic rubber production and material short-

[1] Presented at A.S.T.M. Symposium on the Applications of Synthetic Rubbers, Cincinnati, O., Mar. 2. The A.S.T.M. will soon publish all the papers in a symposium booklet.
[2] Chief chemist, mechanical goods division, General Tire & Rubber Co., Wabash, Ind.

ages, the program was carried to completion. The molding of Chemical Warfare Service faceblanks is one of the most difficult of any molded goods part; so the volume production of these parts from a very soft GR-M compound is an outstanding tribute to the cooperative effort and ingenuity of American rubber technologists. Furthermore very little reduction in quality resulted from this conversion. In addition to the work accomplished by cooperative programs, individual effort has produced molded items that were almost equal in quality to those made from natural rubber. By the use of innovations in compounding it has been possible to develop good-quality medium-soft GR-S compounds, resilient GR-M compounds, and quite satisfactory stocks from both synthetic rubbers for moderate low-temperature service. An important result of concentrated development work on a cooperative project is the fact that compounding tricks and short cuts so learned can be often adapted to other products. Thus it will be possible to develop improved GR-M compounds both from the standpoint of quality and also of reduction in curing cycles, as a result of the program on synthetic rubber gas masks. The industry in general will profit accordingly.

Variations in Raw Materials

A further stumbling block in the conversion of molded products to synthetic rubbers has been the variability in both quality and quantity of raw materials. It was rather commonly felt a few years ago that with a little more time we would be able to control materials so closely that synthetic rubbers would be far more uniform than natural rubber. However it is highly questionable if any marked superiority over Mother Nature and her native assistants has yet been achieved. Recently it was found necessary to go over a large shipment of a synthetic rubber, bag by bag, and check the uniformity of the material in each with a Shore durometer. When the readings were found to range from a low 40 to a high of 65, the entire shipment was classified as soft, medium, and hard. An improvement in processing resulted from this method of classification. The immediate requirements for special materials in quantity has at times created serious delays in supply which were further aggravated by wartime shipping schedules. Often it has been necessary to order even experimental lots of materials three to four weeks ahead of the time they were needed. Adoption of the principle of "too much and too early" has been found to improve this situation. In some cases service procurement agencies have been asked to help expedite material shipments.

Processing Problems

In the processing of molded goods compounds the general-purpose synthetic rubbers have presented a number of problems. Early efforts to process GR-S stocks through the stages of mixing, tubing, and pressroom preparation were hampered by the inherent toughness of this material. It was found, however, that improved methods of breakdown of the crude made a distinct improvement in processing all along the line. Pigment dispersion is still somewhat of a problem, but, in general, it can be said that GR-S stocks process as well and in some cases better than similar natural rubber stocks. Although it is well known that GR-S compounds are poorer in hot tear than rubber, this weakness has not interfered to a great extent in the molding of this material. During cure the GR-S stocks behave very much like natural rubber from the standpoint of flow properties. In fact the percentage of defectives on some parts, when produced from GR-S, is lower than when these same parts were made from rubber. The poorer tear resistance of GR-S compounds is actually an advantage when it comes to removing rind or flash as there is less tearing into the part itself.

Processing problems on GR-M compounds have been somewhat more serious. In mixing and tubing operations GR-M stocks have been found to be somewhat more "scorchy" than rubber. This condition has made it necessary to take particular care with certain GR-M compounds of the fast-curing type. Banbury and tube machine temperatures must be kept down as much as possible. Also, the time between mixing and curing must be kept as short as possible to avoid "set-up" conditions. At least one manufacturer has established a maximum permissible time period of 16 hours between mixing and curing of a particular GR-M compound. The tubing and pressroom preparation of soft GR-M compounds has been difficult because of their tendency to flatten out before they become firm. This condition has been counteracted to a certain extent by the use of special equipment to maintain the shape of the prepared pieces before they are cured. The same property of softening under heat has also complicated the curing of GR-M compounds. This material softens quite rapidly when it comes in contact with a hot mold surface. The result is that it tends to flow out of the cavity before it becomes stiff enough to allow trapped air to escape. Blisters, flow marks, and light pieces result. There are two solutions to this problem. One is to increase the rate of set-up to provide a firm material as soon as possible in the curing process. Another is to redesign the molds so as to restrict the flow of the material and prevent its escape from the cavity. Of course the latter solution would be the more desirable from the standpoint of safe handling compounds. However new molds are expensive and require valuable time for their construction. Therefore the best use of existing equipment is accomplished by adjusting compounds to process in that equipment.

Establishment of Factory Cures

In establishing and maintaining factory cures on molded products from natural rubber we have been accustomed to the use of free sulphur determinations on samples of finished parts. These were then compared with similar determinations on laboratory press cured slabs. In this way the actual state of cure of the molded part could be determined. This method, however, has not been found adaptable to synthetic rubbers. This problem of accurately choosing the proper time and temperature for factory cures on synthetic rubbers is best shown by a comparison of test results on typical molded goods compounds formulated from the natural rubber, GR-S, and GR-M. The formulae for these compounds are shown in Table 1.

TABLE 1. FORMULAE FOR TEST COMPOUNDS

Rubber No. 1		GR-S No. 1		GR-M No. 1	
Smoked sheet	100.00	GR-S	100.00	GR-M	100.00
Captax	0.30	Santocure	1.00	Light calcined magnesia	2.00
Altax	0.60	D.P.G.	0.15	Zinc oxide	10.00
D.O.T.G.	0.10	Sulphur	2.00	Furnex	33.00
Sulphur	2.00	Kosmos 40 carbon black	61.50	Circo light cycle oil	5.00
Kosmos 40 carbon black	56.00	Bardol	5.00	Stearic acid	0.50
Medium process oil	5.00	Stearic acid	0.50	Permalux	0.50
Stearic acid	0.50	Zinc oxide	3.00	Neozone D	1.50
Zinc oxide	3.00	Neozone D	1.00		
Neozone D	1.50				
Total	169.00	Total	173.15	Total	152.50

In comparing the free sulphur determinations on various cures of the natural rubber and GR-S compounds in Figures 1 and 2 one can see the difficulty in establishing factory cures on the basis of this determination. T-50 tests have been reported as being equally unsatisfactory in showing the state of cure of GR-S compounds. Results on tensile strength modulus at 300% elongation, elongation at break, and hardness as shown in Table 2 can be used

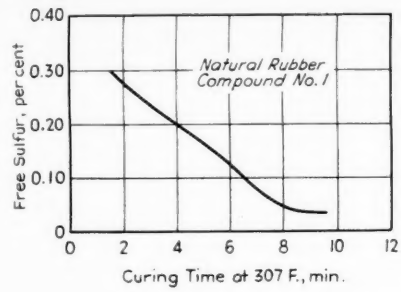

Fig. 1. Free Sulphur vs. Curing Time for Natural Rubber

TABLE 2. PROPERTIES OF TEST COMPOUNDS

Curing Time @ 307.4° F., Min.	% Free Sulphur	Tensile Strength P.S.I.	Modulus @ 300% Elong., P.S.I.	Elongation at Break %	Durometer Hardness Shore	A.S.T.M. Hardness Number	Compression Set, %*
			Rubber No. 1				
2	0.34	2920	1110	590	55	73	
4	0.29	3010	1210	570	56	63	66.4
6	0.20	3010	1230	560	56	67	
8	0.13	2940	1250	540	56	67	32.0
10	0.05	2930	1290	540	56	66	
12	0.03	2800	1250	430	56	67	22.0
16							19.0
			GR-S No. 1				
10	0.04	1810	1380	380	57	73	39.0
15	0.03	1900	1590	390	58	70	32.0
20	0.03	1840	1520	350	58	70	26.0
25	0.04	1840	1570	300	58	68	24.0
			GR-M No. 1				
4		2520	1150	690	60	61	
8		2740	1210	665	61	61	52
12		2650	1250	660	61	58	40
16		2580	1290	610	62	57	23
20		2610	1400	580	62	57	23

* Determined in accordance with the A.S.T.M. Tentative Methods of Test for Compression Set of Vulcanized Rubber (D395-40T).

in setting of factory cures. However the majority of molded parts are of irregular cross-section and cannot be used for these tests. Compression set tests can be used although it is necessary to use caution in comparing the results on factory cured parts with laboratory press cured specimens. An examination of Table 2 and Figure 3 shows that as the curing time increases, optimum values for tensile strength, modulus at 300%, and elongation at break for the synthetic rubbers are reached before those for compression set. A comparison of compression set for GR-S, GR-M, and natural rubber is shown graphically in Figure 3. In choosing the proper factory cure for molded parts from synthetic rubber it is necessary for the technologist to consider the combined effect of the following factors: (1) physical tests on laboratory press cured samples; (2) physical tests on factory cured parts; (3) size and thickness of molded parts; (4) heat losses involved in curing operations; (5) service requirements.

Adhesion of Synthetic Rubbers to Metals

Adhesion to metal has also been found to be a rather difficult problem when synthetic rubbers are substituted for natural rubber. Nevertheless similar techniques and adhesive materials as those used with natural rubber have been found reasonably effective with the synthetic materials. In some cases slight variations, such as the addition of sulphur or the use of tie cements, have improved the adhesion. A comparison of the results obtained on the three typical molded goods compounds given in Table 1 using several variations in technique is shown in Table 3. It is obvious that under proper conditions entirely satisfactory adhesion results can be obtained with both GR-M and GR-S. The use of brass plating has been quite satisfactory in production. The commercial adhesive cements have also produced good results when the proper technique is used. Examination of Table 3 shows that the addition of ester-type plasticizers such as tri-butoxy-ethyl-phosphate (T.B.E.P.) complicates the problem of getting good adhesion to metal with synthetic rubbers. This effect is not restricted to synthetic rubbers, however, as a similar depreciation in adhesion results when plasticizers are added to a natural rubber compound. This problem has not been solved although some improvement in adhesion of synthetic compounds containing ester-type plasticizers can be obtained by the use of tie cements and tie gums. Fortunately for most general-purpose applications large amounts of plasticizers are not required.

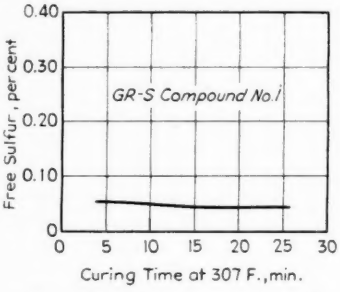

Fig. 2. Free Sulphur vs. Curing Time for GR-S

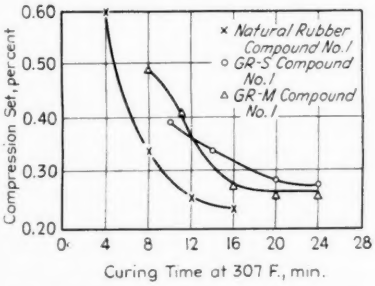

Fig. 3. Compression Set vs. Curing Time for Natural and Synthetic Rubbers

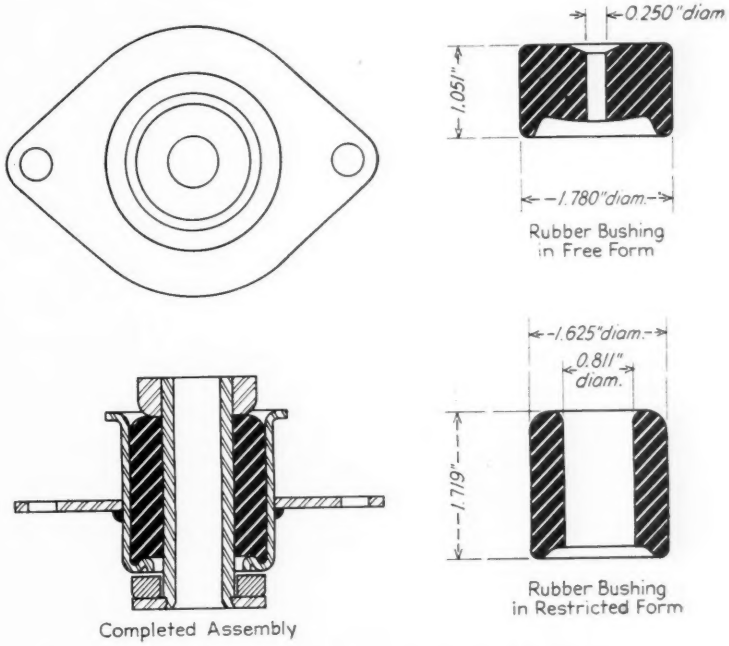

Fig. 4 Assembly of General Tire Silentbloc in Which Bonding Is Obtained by Compression and Extension of the Rubber Member

TABLE 3. COMPARISON OF METAL ADHESION OF NATURAL RUBBER, GR-S, AND GR-M

Base	Material	Metal	Metal Treatment and Cements	Adhesion, P.S.I.
Rubber	No. 1	Steel	Brass plate and rubber cement	415
GR-M	No. 1	Steel	Brass plate and neoprene cement	337
GR-S	No. 1	Steel	Brass plate and rubber cement	537
Rubber	No. 1 plus 1 % sulphur	Steel	Brass plate, no cement	465
GR-M	No. 1 plus 1% sulphur	Steel	Brass plate, no cement	679
GR-S	No. 1 plus 1% sulphur	Steel	Brass plate, no cement	320
Rubber	No. 1	Steel	Sandblast, No. 1 resin cement plus a combination of No. 1 resin and rubber cement	533
GR-M	No. 1	Steel	Sandblast, No. 1 resin cement plus a combination of No. 1 resin and neoprene cement	382
GR-S	No. 1	Steel	Sandblast, No. 1 resin cement plus a combination of No. 1 resin and rubber cement	216
Rubber	No. 1	Steel	Sandblast, No. 1 chlorinated rubber plus a rubber cement	738
GR-M	No. 1	Steel	Sandblast, No. 2 chlorinated rubber plus a neoprene cement	375
GR-S	No. 1	Steel	Sandblast, No. 1 chlorinated rubber plus a rubber cement	523
Rubber	No. 1	Aluminum	Sandblast, No. 1 chlorinated rubber plus a rubber cement	741
GR-M	No. 1	Aluminum	Sandblast, No. 2 chlorinated rubber plus a neoprene cement	354
GR-S	No. 1	Aluminum	Sandblast, No. 1 chlorinated rubber plus a rubber cement	441
Rubber	No. 1 plus 9% T.B.E.P.	Steel	Sandblast, No. 1 chlorinated rubber plus a rubber cement	155
GR-M	No. 1 plus 9% T.B.E.P.	Steel	Sandblast, No. 2 chlorinated rubber plus a rubber cement	228
GR-S	No. 1 plus 9% T.B.E.P.	Steel	Sandblast, No. 1 chlorinated rubber plus a rubber cement	182

Of course the most satisfactory method of solving the problem of adhesion with synthetic rubber is to design the part so that proper functioning does not depend on chemical adhesion of rubber to metal. This has been done quite satisfactorily with one of the most important applications of rubber, that of vibration insulation. It has been accomplished by the use of the bonding effect resulting from the compression and extension of rubber in an annular space between an inner pin and an outer sleeve. The completed assembly provides a vibration and shock absorbing mounting in which the rubber component is held in place by very strong compressive forces. A commercial example of this assembly is shown in Figure 4. The rubber bushing, as molded, is shown in the upper right hand drawing. In the lower right hand figure the shape of the rubber bushing after it has been compressed and extended between the outer sleeve and the inner pin, as mentioned above, is shown. The end and side views of the completed assembly are shown at the left. The advantage of such an assembly is that synthetic rubbers containing plasticizers for low-temperature service can be used satisfactorily. Compounding for chemical adhesion of rubber to metal is then not the prime consideration. Other devices which involve mechanical clamping to metal parts have also been used to advantage.

Service Performance of Synthetic Rubber Molded Products

The problem of correlating laboratory test results with actual service performance is encountered with synthetic rubber as it was with natural rubber. There is always the question of how much longer a stock with high tensile strength will stand up in service than one with medium strength, or how soft a material is actually required to satisfy a given application. These questions and many similar ones can be answered by service experience only. Since the use of synthetic rubber for general-purpose applications is relatively new, quantitative data are not readily available. However the background of several years' experience in the use of special-purpose synthetic rubbers has helped in predicting performance of the general-purpose types.

In analyzing a given application to determine what type of synthetic rubber and what grades of compound should be used, one must know the answers to the following questions:

1. Approximately what hardness of material is required?
2. Under how much load is the part subjected and how is it applied?
   (a) Tension.
   (b) Compression.
   (c) Shear.
3. What range of temperatures are involved?
4. How much abrasion is encountered?
5. Is weather or ozone resistance required?
6. What fluids are in contact with the part?
   (a) Oils, solvents, or coolants.
   (b) Water or steam.
   (c) Acid, alkali, or other chemicals.
7. Is severe flexing encountered?
8. Is good resiliency required?
9. Is flame resistance required?

From these answers sufficient information is usually provided for the technologist to choose the proper synthetic rubber and grade for any application. The service performance to be expected of general-purpose synthetic rubbers under the above conditions is given below:

1. HARDNESS RANGE. GR-M can be formulated to give a Shore durometer hardness range in molded products of from 40 to 95. Satisfactory GR-S compounds are available in the range of 45 durometer to hard rubber. Natural rubber has a somewhat wider range than either in that compounds from 30 durometer to hard rubber are available.

2. LOAD SUPPORT. (a) *Tension.* Maximum tensile strength values of 3000 psi. may be obtained with reenforced GR-S compounds, although not in all hardness values as with natural rubber. GR-M compounds may give 3,500 to 4,000 p.s.i.; while 4,500 p.s.i. tensile strength may be obtained with natural rubber compounds.

(b) *Compression.* GR-M compounds will support heavy loads in compression and will suffer only slightly more permanent deformation than similar natural rubber compounds. GR-S compounds undergo considerably more permanent deformation than GR-M or natural rubber compounds at normal temperatures, but are less affected by elevated temperatures. The compression set data in Table 4 illustrate this temperature effect.

TABLE 4. COMPRESSION SET OF NATURAL AND SYNTHETIC RUBBER COMPOUNDS*

Base Material	Compression Set, % 7 Days at Room Temperature	14 Days at Room Temperature	24 Hr. @ 158° F.	48 Hr. @ 158° F.
Natural Rubber Compound A	10.1	10.1	19.6	21.6
GR-S, Compound A	26.4	27.5	31.4	34.8
GR-S, Compound B	21.5	24.8	20.3	22.3
GR-M, Compound A	13.5	14.2	19.0	22.5
GR-M, Compound B	10.0	10.0	16.9	18.9

* A.S.T.M. D395—40T.

(c) *Shear.* The shearing strength of both GR-S and GR-M is inferior to that of good natural rubber stocks.

3. TEMPERATURE RANGE. GR-M compounds possess better heat resistance than natural rubber compounds. However natural rubber is much more satisfactory at low temperatures. The crystallizing effect after continued exposure to low temperatures is observed with both GR-M and natural rubber, but it is far more pronounced with the former. Plasticizer addition definitely improves the properties of GR-M compounds at low temperatures. However they do show a progressive increase in hardness with a drop in temperature. GR-S compounds are also better than natural rubber in resistance to the deteriorating effect of high temperatures, although not so good as GR-M.

Low-temperature flexibility can be obtained in GR-S compounds by the addition of special plasticizers.

4. Abrasion. In abrasion resistance GR-S compounds are in general equal to or better than natural rubber. Yet where severe chipping or cutting is involved, GR-S is usually unsatisfactory. For such severe conditions GR-M compounds are usually specified. When abrasion together with exposure to oil is encountered, GR-M gives more satisfactory service than either natural rubber or GR-S.

5. Weather and Ozone Resistance. In service involving weathering and the action of ozone, GR-M is much better than either GR-S or natural rubber. But the weathering properties of GR-S compounds can be improved greatly by the addition of waxes such as have been used successfully with rubber.

6. Oil and Solvent Resistance. Of the general-purpose synthetics, GR-M is the only one having good oil or solvent resistance. It is quite satisfactory under moderate oil conditions. GR-S compounds do not swell so much as natural rubber, but their tensile strength and tear-resisting properties deteriorate rapidly. For water and steam resistance GR-S compounds are somewhat better than GR-M. Chemical resistance is dependent on the specific chemicals encountered and requires individual analysis of the problems involved.

7. Flexing Life. GR-S compounds are in general not very satisfactory where severe flexing is encountered. More heat is generated in the material itself owing to the flexing. Also, when slight cracks develop, failure often results. GR-M compounds are reasonably satisfactory in flexing service.

8. Resilience. Both GR-S and GR-M compounds are definitely inferior to natural rubber in regard to resilience. In compounds of the same hardness, GR-M stocks show from 80 to 90% and GR-S stocks show from 60 to 70% of the resilience of natural rubber stocks as measured by rebound on a Goodyear-Healy pendulum.

9. Flame Resistance. GR-M compounds are superior to either GR-S or natural rubber in flame resistance.

When the synthetics are used in the applications best suited for them, they unquestionably will give entirely satisfactory service. In fact under certain conditions an improvement in service life will result when they are substituted for natural rubber.

Special-Purpose Synthetic Rubbers

In addition to the general-purpose synthetic rubbers quite a number of special-purpose types have been used for a number of years in molded products. Among these are such brand names as Hycar OR-15, Hycar OR-25, Perbunan, Butaprene NF, Butaprene NM, Chemigum, Neoprene FR, Neoprene ILS, Neoprene KNR, and Neoprene CG. The properties of the more common types in use may be described as follows:

1. Hycar OR-15 and Butaprene NM:
   (a) Excellent hot oil resistance.
   (b) Good heat resistance.
   (c) Good aromatic fuel resistance.
2. Hycar OR-25, Perbunan, Butaprene NF:
   (a) Good hot oil resistance.
   (b) Good heat resistance.
   (c) Good aromatic and 100-octane fuel resistance.
   (d) Good low-temperature flexibility.
   (e) Good hydraulic fluid resistance.
3. Neoprene FR:
   (a) Low compression set.
   (b) High resiliency.
   (c) Excellent low-temperature flexibility.
   (d) Good hydraulic fluid resistance.

Each application requires special compounding, and the exact service conditions involved must be known to provide a basis for a proper choice. Although these synthetic rubbers are usually used alone, it is sometimes necessary to make blends of them to obtain the right balance of properties. With these combinations the possibilities of varying the properties of any material are greatly multiplied.

The Future of Synthetic Rubber in Molded Goods Products

The question arises as to the part that synthetic rubber will play in the post-war picture of molded goods products. Of course the special-purpose synthetic rubbers are already firmly established in such parts as seals, diaphragms, gaskets, packings, and countless other products where any of the conditions requiring their special properties exist. The uses of these will definitely continue to expand. The answer to the question of permanent use of the general-purpose synthetic rubbers after natural rubber becomes available will depend on a number of considerations. Important, of course, is the price comparison between synthetic rubbers and natural rubber. This cannot be predicted at the present time. However equally important is the comparison in utility between synthetic rubbers and natural rubber. For applications where exceptional age, heat, weather, ozone, flame, and oil resistance are needed, the synthetic rubbers will undoubtedly continue to be preferred. As service data are accumulated, the value of synthetic rubbers in these applications will become more evident. Then on the basis of more service value our customers may demand that the synthetic materials must remain in use for many molded products.

Acknowledgment

The author wishes to acknowledge the assistance of The General Tire & Rubber Co. technical personnel in the preparation of this paper and the permission of Howard Dodge, of this company, to publish it.

Facts about Sieves and Testing

Every once in a while we read articles on testing sieves and testing products in which the 325-mesh sieve is mentioned as being the finest sieve used. This point leads the writer to believe that possibly many sieve users do not know that there is a sieve of 400-mesh made in the United States, which is claimed by the manufacturer to be the finest in the world. This sieve is woven of wire that is exactly one mil or 0.001-inch in diameter. The size of the opening is therefore 0.00167-inch by 0.00167-inch as may be readily computed because 400 wires each 0.001-inch in diameter take up 0.4-inch. Hence six tenths of the inch is open area.

An interesting fact about wire only one-thousandth of an inch in diameter is that if you will cut off a piece of that wire one-thousandth of an inch from the end, you will have a piece which has a projected area of exactly one-millionth of a square inch. You can actually see the piece with your naked eye. But you cannot pick out a single opening in the sieve with the naked eye and concentrate on it. There are 160,000 square openings per square inch in this remarkable 400-mesh sieve by the way —54,375 more opening per square inch than in the 325-mesh sieve. The area of each opening is 0.0000028-square inch.

Abstracts of Technical Data in the Field of Synthetic Rubber Seized by the Alien Property Custodian—III[1]

Frederick W. Breuer[2]

PLASTICIZERS. Muller et al, A.P.C. Pending Application Serial No. 332,700, May 1, 1940. The following products are listed: homologous aromatic hydrocarbons with high molecular aliphatic side chains, esters of aromatic acids with high molecular fatty alcohols of high molecular fat acids with aromatic alcohols or phenols; high molecular fatty acid amides substituted with aromatic radicals; mixed ethers of high molecular aliphatic alcohols with aromatic alcohols. (Sulphur analogs of above compounds are disclosed in Serial No. 332,701.)

Plasticizers. Rhenania Ossag & Metallgesellschalt, Frankfort, A.P.C. Pending Application Serial No. 371,463, December 23, 1940. The principal synthetic rubbers are plasticized by the extracts obtained by treatment of mineral oils with furfural, sulphur dioxide, etc., and natural miri oils, which are rich in resin forming bodies. These softeners are added either to the monomers or in the early polymerization stages. These products being unsaturated enter into reaction with the polymer. A.P.C. Pending Application Serial No. 371,464 follows closely the preceding specification, but applies to "Thiokol"-type elastomers.

Stabilizers for Oxidation (Heat) Plasticized Buna S. Gartner et al, A.P.C. Pending Application Serial No. 352,520, August 14, 1940. Buna S to which numbered buna may be added as plasticizer is heat plasticized in the presence of anticyclicizing agents (phenyl beta naphthylamine), and 1-3% of anhydroformaldehyde aryl amines (e. g., 1,3,5 triaryltrimethylene triamines) are added to maintain plasticity over prolonged periods. Tabulated data show effect on plasticity and recovery (within 30 seconds) over 28-day period. Flocculation rates, being indicative of plasticity, are given for periods up to 16 weeks.

Plasticizers. Deutsche Hydrierwerke, German Application D78,931 IVc/39b, September 21, 1938. Seized by A.P.C., TC 263 (i). High molecular asymmetric ketones containing one aromatic radical, e.g., tetrahydronaphthylundecyl ketone, are suggested.

Plasticizers. Deutsche Hydrierwerke, German Application D786,771 IVc/39b, August 15, 1938. Seized by A.P.C., TC 263 (c). Cycloaliphatic alcohol esters of monocarboxylic acids with not more than 10 carbon atoms, e.g., hydroabietyl/lactate, methylcyclohexylbenzoate are suggested.

Plasticizers. Deutsche Hydrierwerke A. G., German Application D78,711 IVc/39b, A.P.C., TC 263 (e), August 19, 1938. A liquid high-molecular unsaturated mineral oil (iodine No. 83, mol. weight approximately 430) is milled at 80° C. with polyvinyl chloride acetate to form films which are claimed to be particularly suited as cable insulation.

Plasticizers. Rhenania Ossag, A.P.C. Pending Application, Serial No. 361,195, October 14, 1940. Heat treatment of Buna S effected in the presence of 15% of an unsaturated fraction, separated by acid or solvent refining of mineral oil, yields superior products at lower temperature and under shorter treatment. The plasticizing oils may also be imparted to the buna latex. Physical data showing the effect of the plasticizer on thermal stability, tensile strength, and elongation are given.

Improving Cold Resistance. Columbes-Goodrich, Unfiled Application A.P.C., TC 134 (b), France, March 5, 1941, and January 23, 1942 (French Application 455,866). Better resistance to cold embrittlement of synthetic rubbers results from incorporation of 5% to 50% of light lignite oils boiling at 250 to 350° C. and other hydrocarbon and tar oils. This material serves also as extender; no undue plastification takes place. The compounded material can be vulcanized.

Extenders. I. G. Farbenindustrie, A. G., Unfiled Document A.P.C., German Application I62,956 IVd/39b, TC 1101. (Copy to Standard Oil Development Co.) Asphaltic substances such as mineral rubbers can be replaced to advantage by high-boiling components and residues of the hydrogenation of coal formed under high pressure with catalysts. For the purpose of using these products as extenders and softeners they should be freed of ash and other insoluble components. A table compares tear resistance, rebound elasticity, modulus, and Shore hardness of samples compounded with above substances with those containing various commercial mineral rubbers. Whereas modulus is about the same, all other properties are better if purified coal hydrogenation residues are applied.

Naphthenic Acids as Accelerators and Plasticizers. Rhenania Ossag—Metallgesellschaft, Unfiled Application A.P.C., TC 285 (l), German Application R106,820 IVc/39b, January 22, 1940. Plasticizing, wetting, age-resisting agents for Buna N, Buna S, and neoprene-type elastomers are low and higher molecular weight naphthenic acids and their water insoluble, non-desiccating, particularly lead and zinc salts. Whereas the low molecular weight acids act primarily as accelerators, the higher ones possess plasticizing properties.

Solvents, Swelling Agents. Deutsche Hydrierwerke, Unfiled Application A.P.C., TC 263 (d). German Application D78,679 IVc/39, August 15, 1938. Esters of polybasic aromatic acids and phenols (e.g., dicresyl phthalate) are softening and gelatinizing agents for hydrocarbon polymers.

[1] Classified and abstracted by the Office of Assistant Deputy Rubber Director for Research and Development of Synthetics, Polymer Research Branch, C. S. Fuller, Chief.

[2] Present address, Armstrong Cork Co., Lancaster, Pa.

Modified Alkyd Resins as Softening and Extending Agents. Endres, Abandoned Files U. S. Patent Office, Serial No. 240,705, November 16, 1938. Alkyd-type resins, modified with higher molecular fatty acids (e.g., oleic), are milled in quantities up to 20% with synthetic rubber and vulcanized for one half hour at 132° C. An excellently resistant and viscous product is obtained.

Stabilization of Polymers Containing Halogen. I. G. Farbenindustrie A. G., A.P.C., Pending Application Serial No. 389,417, April 19, 1941, and No. 391,512, May 2, 1941. Methods of stabilizing polymers containing chlorine against discoloration and of improving their heat resistance are disclosed. A sodium carbonate treatment (0.03 to 0.2%) is followed by drying and milling with 0.03 to 1% diphenylurea or from 0.5 to 4% of dodecyl-, octadecyl-, phenylethyl alcohols, hydroxethyl cresol, -naphthol decahydronaphthol or hydroxydodecahydrodiphenyl.

Prevention of Discoloration by Action of Light. Chomette et al, A.P.C., No. 335,356, May 15, 1940. Resistance against discoloration by ultra-violet light is secured by imparting several per cent. of a 50% aqueous solution of dimethylolurea with the compounded rubber. On vulcanization a urea formaldehyde resin forms which is evenly dispered in the product.

Amorphous Silicic Acid Filler. I. G. Farbenindustrie, German Application I 67382 IVc/39b of June 10, 1940. (Disclosed to Standard Oil Development Co. TC 1199.) The chemical properties of polyisobutylene are very considerably improved by the addition of amorphous silicic acid (as shown by X-ray spectographs and by the property of not becoming crystalline up to temperatures of 1000° C). The compounded polyisobutylene shows good electrical insulation properties and is of light color. In addition to the above applications it is also suggested as a gasket material for food preserving containers.

Agents Improving Adhering Properties of Polysulphide Condensation Products. Silesia, Abandoned Files U. S. Patent Office, Serial No. 251,694, January 19, 1939. Compounding of "Thiokol"-type rubbers with small quantities of compounds possessing one negative group is disclosed. This compounded "Thiokol" rubber adheres well to metal surfaces.

Carbon Black. Auer Gesellschaft, Berlin Serial No. 234,492, October 11, 1938, Abandoned Files, U. S. Patent Office. 400-500 grams anthracene residues per m^3 of gas are vaporized with combustible gases containing not more than 25% carbon monoxide (illuminating-, blast furnace-, generator gas) preheated to 350-400° C. and burnt in burners of maximum bore diameter of 0.75 mm.; oxygen or air is admitted after emergence of the vapors from the burners. The active carbon black is deposited on cooled surfaces. Yields 60-70% based on anthracene. (Rejected over prior art.)

Impingement Black. Russwerke Dortmund, U. S. Patent Office, Abandoned Files Serial No. 268,144. Improvements are claimed for the manufacture of impingement black by burning gases enriched with naphthalene and anthracene through a concave slotted burner tip.

Impingement Black. Deutsche Gold & Silber Scheideanstalt, U. S. Patent Office, Abandoned Files, Serial No. 266,886. Yield and quantity of carbon black are improved by maintenance of a laminar flow of gases enriched with naphthalene and anthracene both before and after the combustion and avoiding turbulence through use of specially constructed burners.

Vulcanization and Fabrication

Active Phenol-Formaldehyde Resins as Vulcanizing Agents. Wildschut, A.P.C. Serial No. 357,662, September 20, 1940. Equal parts of Perbunan and a resol (active state of phenol formaldehyde resin) are milled, cured without sulphur or sulphur compounds for two hours at 155° C.; the vulcanizate possesses a tensile strength of 65 kg/cm^2 (925 lbs./sq. in.), elongation of 326%, and 57 Shore durometer units of hardness.

Active Phenol Formaldehyde Resins as Vulcanizing Agents. Rubber Foundation, Amsterdam, Abandoned Patent Application Serial No. 301,164. Vulcanization of natural and synthetic rubber, particularly of the Perbunan type, with up to 50% of an active phenol formaldehyde resin imparts superior solvent resistance to the cured product.

"Thiokol" Molding Powders. Silesia, Abandoned Application Serial No. 256,774. The preparation of non-sticky powders from "Thiokol" rubber is disclosed. A latex to which compounding ingredients have been added is freed of the bulk of water and dried at 40 to 60° C. A powder suitable for molding purposes is obtained.

Vulcanization with Divinyl Compounds. Mertens, A.P.C. Serial No. 202,011, April 14, 1938. Hardening of polyisobutylene (Vistanex, Oppanol) is effected by imparting on the milling machine 30% of a mixture of styrene containing 1% of divinylbenzene. Diolefins or their lower polymers become cross-linked by the application of the systems styrene + divinylbenzene, acrylic esters and divinylbenzene, divinyl ketone, divinyl ether, vinyl propenyl benzene and can be pseudo vulcanized in the absence of sulphur, preferably in an atmosphere of water vapor. It is claimed that whereas sulphur vulcanization causes dielectric loss, products obtained according to invention possess high insulating properties.

General Plant Problems

Regulators for Gas Generators. Lell, A.P.C. Serial No. 385,193, March 25, 1941. The use and construction of impulse feelers for the various intermediate service states obtaining in a gas generator set are disclosed.

Agitation of Polymer Emulsion by Refluxing. Leverkusen Deposita Case No. 216, Hutz & Joslin Files, A.P.C. New York, N. Y. TC1086. Emulsion polymerization is carried out in the presence of a low boiling material (butane, propane) in a vessel equipped with reflux condenser to which a return pipe with syphon is attached; the gases are admitted under the surface of the emulsion. Very efficient agitation is claimed to result; the emulsion particles are smaller than obtainable by stirring. High polymer concentrations in the emulsions are secured.

Reclaiming

Reclaiming Vulcanized Synthetic Rubbers. Gumlich et al, A.P.C. Application Serial No. 327,634, April 3, 1940. Application of 1-5% aromatic mercaptans (thiophenol, cresol, naphthol, xylol, thioanthracene) in reclaiming ground vulcanizates of Buna S, Buna N, and neoprene is disclosed. Preferably an over-pressure of 3 atmospheres of air and 3 atmospheres of steam is applied at 130° C. 5% of "caoutchol" may be used as interpenetrating aid.

(To be continued)

The du Pont Modified Williams Plastometer

W. Newlin Keen [1]

WEBSTER defines plasticity as "the ability to retain a shape attained by pressure deformation." Plasticity measurements are made by rubber technologists for one or more of the following reasons: (1) to measure the workability of rubber or synthetic elastomers; (2) to determine the effect of natural or accelerated aging on the processability of compounded rubber or synthetic elastomers; (3) to determine to what extent softeners or compounding ingredients may have affected the workability of rubber or synthetic elastomers; (4) to serve as a control test in the manufacture of synthetic elastomers.

The Williams Plastometer has been widely used in the rubber industry for a number of years. Since its introduction in 1924 by Williams[2] it has undergone a number of refinements[3] which have improved its mechanical efficiency and simplified its operation. However the fundamental operating principles of this machine have been retained.

This article discusses the modifications that have been incorporated into the instrument now in use at the du Pont Rubber laboratories.

Description of the Instrument

Figure 1 shows one of the first Williams plastometers that was used in the du Pont rubber laboratory at Deepwater, N. J. This instrument, which is still available, is a simple device that induces a dead weight load of five kilograms on a pellet of constant volume (2 c.c.) between two parallel plates (4.5 inches by 4.5 inches). The dial gage indicates the thickness of the pellet as it is being compressed. This plastometer was operated at a given constant temperature (100° C.), and dial gage readings were taken at specified intervals of time (three, five, and ten minutes). From these data Williams plotted thickness-time curves which conformed to the general equation of the form $Y = KX^n$, where Y equals the thickness of the pellet in millimeters and X equals the time in minutes. From experimental data n was found to be 0.196, giving $K = YX^{0.196}$ where K is called an index to the plasticity of the sample.

Experience has shown that it is unnecessary to plot the thickness-time curve, and, as will be discussed later, the normal measurement of plasticity is expressed as the thickness of the pellet in thousandths of an inch after three minutes' compression. It has also been found that the recovery of the elastomer is an important measure of processability, and this factor expressed as the increase in thickness after one minute's storage at room temperature is usually made at the conclusion of the plasticity determination.

Figures 2 and 3 show the presently used du Pont modified Williams plastometer installed in its especially designed hot air oven.

Figure 4 is a schematic sketch of this plastometer, which

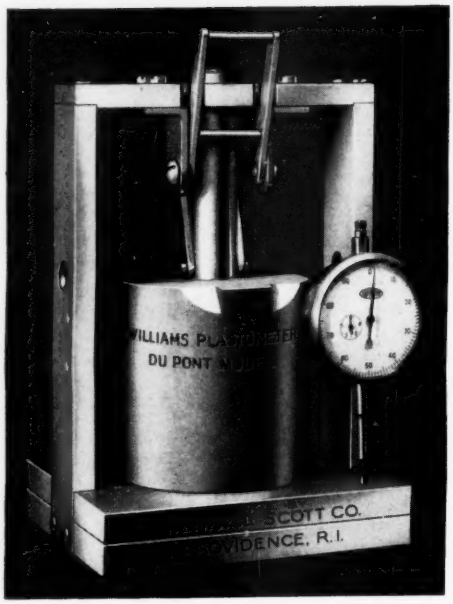

Fig 1. Original Williams Plastometer, du Pont Model

consists primarily of a scale balance that has a capacity of 15 pounds and a sensitivity of 20 grams. This balance is so weighted that it produces a load of five kilograms on the test pellet. The knife edges of the lever mechanism, which is shown in Figure 4, produce not only a minimum of friction, but also permit the movable platen to remain truly parallel to the fixed platen throughout its vertical travel. The brass cams which are used to actuate the movable platen in the loading and unloading of the test pellet are fast-acting and are controlled from the exterior on the right side of the oven. To make the operation of the plastometer less cumbersome the size of the platens used on the original apparatus was reduced and changed in shape to disks (2½ inches in diameter and ½-inch in thickness).

The dial gage, which has jewel bearings, is mounted rigidly to the frame that supports the fixed platen and is actuated by an adjustable arm that is an integral part of the movable platen. Thus the distance between the platens is indicated at all times.

Directly above the platens is the conditioning shelf which consists of two rectangular bars separated by spacer bars 0.4-inch in thickness. The lower bar is fixed, but the upper bar is movable. The movable bar, which is on loose fitting dowels, may be lifted vertically by means of the lever mechanism shown in Figure 4 and is operated from the exterior of the oven on the right side.

The oven is simply constructed of "Transite" and metal parts assembled with bolts and machine screws, making the interior of the oven readily accessible if repairs become necessary. The oven is mounted on neoprene sponge to dampen out vibrations that would affect the accuracy of the test results if transmitted to the plastometer. Circulation of the air in the oven is produced by two six-inch fans. One fan is adequate for operation of the oven, but the two are installed to insure continued operation if one fan motor should fail. The air enters the oven on the lower right-hand side of the working chamber and exits through orifices at the bottom and top of the left-hand side. The air is then circulated over electrical heating elements located above the working chamber and enters at the bottom on the right-hand side, thus completing the cycle.

The temperature of the oven is controlled by a DeKho-

[1] Organic chemicals department, rubber chemicals division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
[2] *Ind. Eng. Chem.*, 16, 362 (1924).
[3] De Vries, *Arch. Rubbercultuur*, 8, 223 (1925); A. van Rossem and H. van der Meyden, *Rubber Age (N. Y.)*, 23, 438 (1928).

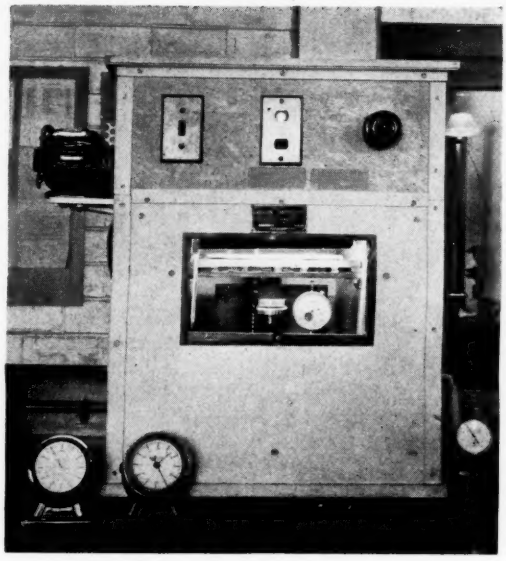

Fig. 2. Modified du Pont Williams Plastometer in Specially Designed Hot Air Oven

tinsky bimetallic thermo-regulator within the oven which is connected through a mercury relay to the heating elements. A thermometer located on the left side of the oven in front of the conditioning shelf indicates the temperature.

The efficiency of the oven is improved considerably by having a vertically sliding window instead of a door which would sweep hot air from the oven each time the platens were loaded and unloaded. This window is mounted on brass door runners and is counterweighted. The window is constructed of two plates of "Tuf-Flex" glass (Hires Turner Co.) separated by a dead air space which is the insulating medium.

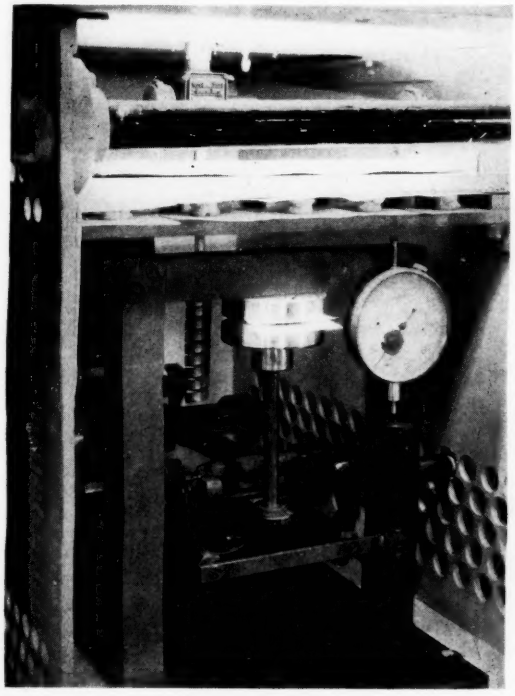

Fig. 3. Closeup of Modified du Pont Williams Plastometer

Preparation of Test Pellets

Immediately after being milled, the raw or compounded elastomer is plied up to a thickness of from 5/8- to 3/4-inch. Special care is taken to prevent the trapping of air between the plies. Three pellets are prepared for each test. They are punched out in a clicking machine, using a special die which produces a pellet having a volume of two cubic centimeters. The die was developed many years ago at the Miller Rubber Co. by Raymond Warner. The pellets are dusted lightly with soapstone and stored in a metal "U" clip in such a manner that the pellets are held to a height of approximately 0.40-inch during storage prior to testing.

Method of Determining Plasticity

Although plasticity measurements may be made over a wide range of temperatures the du Pont laboratories have selected 80° C. as the temperature of broadest interest. The oven temperature is controlled to ± 1° C. The test pellets are removed from the metal "U" clip, put between

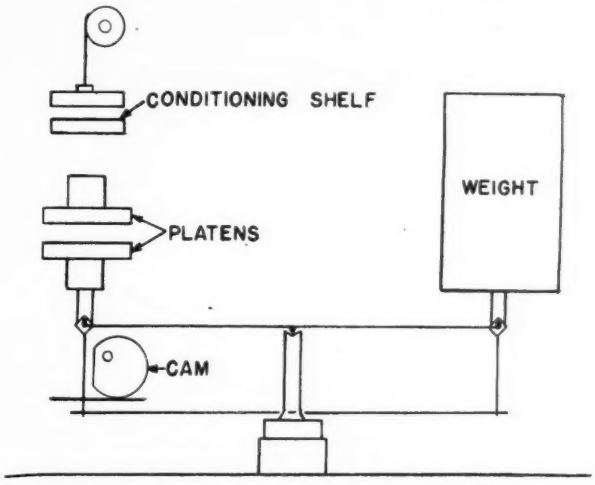

Fig. 4. Schematic Sketch of Mechanism of Modified du Pont Plastometer

two sheets of onion-skin paper, and then placed on the conditioning shelf in the oven for 15 minutes. Here the pellets are compressed before testing to a standard height of 0.4-inch while they are being heated to 80 ± 1° C. Individual pellets in a series for test are placed on the conditioning shelf at three-minute intervals to permit continuous operation. The zero point of the dial gage is checked by placing two pieces of the onion-skin paper between the clean platens, applying the load, and setting the gage at zero. The plastometer is now ready for use.

At the end of the 15-minute conditioning period the pellet is placed in the center of the lower platen, and the load of five kilograms applied. After the load has been applied for three minutes (measured by a stop watch) the dial reading, which indicates the thickness of the test specimen in thousandths of an inch, is recorded as the plasticity figure, and the pellet is immediately removed from the plastometer. The pellet is allowed to cool for one minute at room temperature (82° F.), and then the average thickness of the compressed pellet, still between the two papers, is measured. A Randall-Stickney dial gage, equipped with a foot 0.25-inch in diameter and a three-ounce weight, is used to measure the thickness of the cooled pellet. The measurement is made by taking an average of the readings obtained in the circle whose radius

(*Continued on page 181*)

Recent Russian Literature on Natural and Synthetic Rubber—IX

M. Hoseh

ACCELERATORS K-1, A-19, and 808. Their Physico-Chemical Constants. A. M. Ushakov and A. P. Ermolina. *Kauchuk i Rezina*, 1, 15-22 (1939). **M-16.**

The purpose of this work was to find a set of indices for checking the quality of these accelerators. The existing methods were vague and not reproducible and could hardly serve in the evaluation of the accelerators. Many tests were worked out by the authors to evaluate both chemical and physical indices for characterizing the above accelerators. The chemical tests included determinations of the nitrite number and the iodine number. The physical tests comprised methods for determining moisture, ash, solubility, viscosity, softening point, and flash point. Since the exact structure and the molecular weight of these accelerators are not definitely known, the theoretical question as to what part of this molecule reacts with nitrite was not investigated.

It was found that K-1, A-19, and 808 react quantitatively in an acid medium with $NaNO_2$ and that the results are reproducible. The accelerators are titrated with a 0.5 *N* $NaNO_2$ solution. The latter is standardized against pure *p*-nitroaniline. The *p*-nitroaniline is recrystallized twice from water and dried at 105° C. to constant weight. Its purity is checked by its melting point (148° C.). 1.3-1.4 grams of the pure substance are dissolved in a HCl solution and titrated with 0.5 *N* (34.5 g. per l.) $NaNO_2$ at 0±5° C. The end point is reached when one drop of the titrated solution after the addition of one drop of the nitrite solution will produce on I-starch paper a blue-violet stain that will not disappear after 10 minutes. *p*-Nitroaniline reacts with sodium nitrite according to:

$NO_2C_6H_4NH_2 + NaNO_2 + 2HCl \longrightarrow NO_2C_6H_4N_2Cl + NaCl + 2H_2O$. The titer of the $NaNO_2$ solution is calculated from $T = \frac{a}{V} \cdot f$, where T is the titer expressed in grams of aniline per milliliter, a the weight of *p*-nitroaniline in grams, V the volume of the $NaNO_2$ solution used for titrating, and f a conversion factor of *p*-nitroaniline into aniline and $= \frac{93.06}{138.1} = 0.6732$.

To determine the nitrite number of K-1, a sample of the accelerator is heated to 50-60° C. 1.5-2 grams of the liquid K-1 are placed in a small weighed crucible; the whole is cooled and weighed again. The crucible is placed in a 250-milliliter Erlenmeyer, then are added 20 milliliters of HCl (sp.gr. 1.19) and 40 milliliters of H_2O. The flask is heated carefully on an asbestos pad with boiling avoided until complete dissolution. The solution is transferred into a 500-milliliter porcelain beaker; the flask and the crucible are washed carefully. To the beaker are added 300 milliliters of H_2O, and the whole is cooled to 0 ± 3° C.; then are added 10 milliliters of a 10% KBr solution and the contents of the beaker are titrated as above. The nitrite number $= \frac{V.T.100}{a}$, where V is the volume in milliliters of the standard $NaNO_2$ solution used, T the titer of the nitrite solution, and a the weight of the accelerator taken for analysis. The procedures for A-19 and 808 are essentially the same; A-19 is previously powdered, then weighed, and 808 is weighed directly. The allowed variation between single determinations for K-1 is 0.6%, for A-19, 1.4%, and for 808, 1.25%.

The iodine numbers were determined by methods commonly used for oils and fats. For good results care must be taken to have enough I and to allow sufficient time for the reaction. The Hübl solution was used in these reactions. The I and time requirements were found to be as follows: K-1 12 g. of I per 1 g. of accelerator, duration 5 hrs.; A-19 7 g. of I per 1 g. of reagent, duration 5 hrs.; 808 same as A-19. Although it takes 24 hours to complete the reaction in the case of 808, 5 hours suffice for the purpose of analysis. The allowed variations between determinations are 3% for K-1 and A-19 and 5% for 808.

By the above described procedures the nitrite and iodine numbers for these accelerators were found to be:

	K-1	A-19	808
Nitrite Number	63.1	48.4	41.3
Iodine Number	425±17	304±9	304±15

The physical indices were determined by methods commonly used for the respective determinations. The authors did not intend to establish "constants" for the accelerators. The latter are non-homogeneous mixtures, and such task would be futile. The purpose was to establish certain indices whereby the uniformity of successive batches delivered to plants could be controlled. Readily performed tests were needed. Thus the index of solubility is determined by the weight in grams of the accelerator dissolved in 100 grams of benzene at 20-25° C. To determine the viscosity a sample of the accelerator is placed in a test tube and heated to 60° C. The test tube is inclined at a 45-degree angle, and the accelerator within it allowed to run out. Acceptable viscosity is when the liquid within the test tube flows out freely and completely. The softening point is used rather than the melting point. The results of these determinations are given.

Vulcanization of Galoshes. S. P. Sal'nikov, *Kauchuk i Rezina*, 1, 40-45 (1939). **SN-30.**

A discussion of practices in some plants of U. S. S. R. and some suggested improvements are given.

A Theoretical Analysis of the Viscosity Determination of Latex. I. Limits and Criteria of the Applicability of Poiseuille's Law to Latex. II. The Laws of Hydrodynamics and the Relative Viscosity of Latex. III. The Limiting Coefficient of the Relative Viscosity of Latex. B. M. Kedrov, *Kauchuk i Rezina*, 2, 42-49 (1939). **SN-31.**

I covers theoretical analysis of viscosity determination of latex. When determining the viscosity of latex by its flow through a capillary, it should be kept in mind that Poiseuille's law is applicable only within certain limits. This law holds only when the pressure used lies between two limiting values. If the pressure is lower than the

lower limit, anomalies appear which are caused by structural viscosity. On the other hand when the pressure exceeds the upper limit, the flow is turbulent and causes unduly high viscosity values. By plotting viscosity against pressure it can be seen that within certain limits of pressure the viscosity remains constant. These limits can be determined by making three consecutive measurements having a rate of flow w_1, w_2, and w_3, respectively, under conditions F_1, F_2, and F_3, respectively. Here F stands for either pressure (P) or radius of capillary (R^4) in the Poiseuille equation. The following equations are set up:

$$\frac{F_1 - F_2}{F_2 - F_3} = \alpha \text{ (and) } \frac{w_1 - w_2}{w_2 - w_3} = \beta$$

From an analysis of the curve η *vs.* F it can be seen that if $\alpha/\beta < 1$, the value of viscosity obtained lies below the lower limit, i.e., within the region of structural viscosity. If $\alpha/\beta = 1$, the determinations were made in the region of normal viscosity. In the region of turbulent flow $\alpha/\beta > 1$. β can be also determined as follows: obtain three values w_1t_1, w_2t_2, and w_3t_3, where w_1, w_2, and w_3 are the weight of latex passed through the capillary in time t_1, t_2, and t_3, respectively. Putting $w = \frac{W}{t}$, where W equals weight of latex discharged during entire time of flow, we have

$$\beta = \frac{w_1t_2 - w_2t_1}{w_2t_3 - w_3t_2} \cdot \frac{t_3}{t_1}$$

In the case $W_1 = W_2 = W_3$

$$\beta = \frac{(t_2 - t_1)t_3}{(t_3 - t_2)t_1}$$

In the case $t_1 = t_2 = t_3$

$$\beta = \frac{W_1 - W_2}{W_2 - W_3}$$

II. The flow of a liquid from a tube can be subject to the Poiseuille law or to the Bernulli-Toricelli law or else lies in a region which is a transition between the two. If the pressures remain constant, these three regions are determined by the diameter of the tube. These regions are divided from each other by definite values of the diameter of the tube in which the determinations are made and which roughly can be called capillary, semi-capillary, and tube. Typical determinations of viscosity are described for concentrated and dilute latex, water and glycerine.

III. The relative viscosity of latex $\bar{\eta}'$, i.e., the ratio of the viscosity of latex to the viscosity of some standard liquid η_0 is for practical purposes more important than the absolute viscosity η'. By simplifying a series of mathematical equations Kedrov derives two formulae for $\bar{\eta}'$:

$$\bar{\eta}' = \frac{d_1}{d_2} \cdot \frac{t_1t_2}{(t_2 - t_1)T_2}, \text{ and } \bar{\eta}' = \frac{d_1}{d_0} \cdot \frac{W_2}{W_1 - W_2}$$

The first of these is applicable when no additional pressure is applied on the liquid; the second, where additional pressure is applied and time kept constant. In these formulae d_1 and d_0 are the densities of latex and of the standard liquid respectively; t_1 and t_2 are the time of efflux of a given volume of latex under the influence of liquid column of height h_1 and h_2, respectively; T_2 same as t_2 for the standard liquid; w_1 and w_2 are the weights of latex effluxed in time t under the influence of pressures P_1 and P_2, respectively, and W_2 is the weight of standard liquid effluxing in time t under the influence of pressure P_2.

Combatting Corrosion of Plant Equipment in the Rubber Industry. V. E. Mulakevich, *Kauchuk i Rezina*, 2, 52-63 (1939). **SN-32.**

The three main factors contributing to the corrosion of industrial equipment in rubber plants, particularly vulcanization kettles, are sulphur used in compounding rubber, steam, and pressure. Experiments were conducted covering the inside areas of the kettles with tin and lead, applied electrolytically. A number of other materials were experimented with, including various ceramic products, but the results were less favorable. The composition of the metal used in making the kettles is very important. The presence of copper in it is very effective for inhibiting corrosion.

"White Carbon Black." L. M. Fridberg, *Kauchuk i Rezina*, 2, 82-83 (1939). **M-17.**

The name "white carbon black" is applied to colloidal silica. Even the finest ground silica is not so good a filler for rubber as is colloidal silica. Several methods of producing precipitated silica are discussed. The utilization of the waste from superphosphate works is reported as a very economical practice.

Gutta Percha. S. I. Elkin, *Kauchuk i Rezina*, 2, 88-95 (1939). **N-11.**

A popular review of the nature and properties of gutta percha, its growth outside of U. S. S. R., and its cultivation in that country are covered.

Kinetics of Photochemical Processes in Sodium Divinylate Rubber. A. Ya. Pavlushina, *Kauchuk i Rezina*, 3, 57-66 (1939). **S-28.**

The author made a quantitative study of energy involved when light acts upon rubber. The results point to the fact that the action of light on a sodium divinyl polymer is subject to the general photomechanical laws. The strongest effect is exerted by ultra-violet rays of 4000 Å and less. Under the effect of this wave length the soluble polymer changes to an insoluble one. The effect of light of more than 4000 Å is insignificant and can be detected only at great intensity or after prolonged exposure to it. The photomechanical process in sodium divinylate rubber is analogous to the process taking place in natural rubber. It consists of two stages. In the first the light absorbed by the molecules activates the latter. This action may induce disaggregation and depolymerization. In connection with this the viscosity of polymer solutions decreased. In the second stage of the photomechanical process the molecules capable of reacting polymerize. Because the molecules may combine at various points of their length, a possibility exists that spacial structures are formed. Further polymerization is combined with aging, and in consequence of it the properties of the polymers change. From the results Pavlushina concludes that polymerization is a chain reaction.

Separation of Dusting from Dustless Carbon Black. V. Shumskiĭ and A. Volokh, *Kauchuk i Rezina*, 3, 91-93 (1939). **M-18.**

The set-up for separating dusting from dustless carbon black consists essentially of a vibrating screen on to which that carbon black is fed. Through the screen the carbon black particles enter consecutively two separatory boxes where a fan creates suction carrying away the dust consecutively through three cyclone collectors where it is deposited. The dustless fraction flows out through a gate in the lower of the two separatory boxes.

(Continued on page 181)

GR-S, An Elastically Inverted Polymer[1]

H. A. Braendle[2] and W. B. Wiegand[2]

TO THE compounder faced with the necessity of making tires of GR-S, three main problems need to be faced: (1) processing and handling, including building tack; (2) hot running of the tires on test wheel or road; (3) heat embrittlement and flex crack growth.

Ways and means have been devised to make processing of GR-S possible even though not so easy as with natural rubber.

Laboratory investigation of the hysteresis and heat build-up characteristics of GR-S has so far followed closely the lines developed for natural rubber. These fall into distinct types. Probably the oldest are the rebound tests. Rubber balls are dropped on to solid steel plates, or conversely, steel balls are dropped on firmly supported rubber test slabs. The Lupke (1)[3] pendulum employs a horizontal ram with a double V filar suspension. The pendulum with a rigid arm by which the degree of penetration of the hammer may also be determined (2-4) has found wide acceptance as a means of measuring impact resilience.

The damping effect on free vibration of rubber members is measured on an oscillograph (5) or a torsion pendulum (6) as a means of evaluating hysteresis.

Much ingenuity has been shown in the various forms of flexometers which have been developed to duplicate to a greater or lesser degree the amplitude and frequency of vibration and load carrying conditions of service (7-16) in order to predict heat build-up.

These tests have two things in common. They subject the specimen to relatively low deformations, and they show GR-S to have greater hysteresis than natural rubber. Useful as flexometer tests are in predicting heat build-up of rubber when used as a shock absorber, they throw no light on the mechanism of failure of GR-S due to rapid flex cut growth. This is particularly true when these tests are carried out in the laboratory under substantially isothermal conditions and at ordinary room temperatures (17). The obvious reason is that the deformations induced fall far short of the strains just antecedent to rupture. The problem, therefore, demanded the study of rubber stretched to near rupture.

Stress Relaxations (With Time)

One of the first manifestations of abnormal stress relaxation of GR-S was Shore creep, announced by Columbian Carbon Co. Laboratories (18) and confirmed by the Bureau of Standards (19). This phenomenon has necessitated a new specification for hardness determinations, *viz.*, the reading of the hardness values at 30 seconds after application of the durometer or penetrometer. This relaxation or creep is so characteristic of GR-S that it was successfully employed as a rapid means of distinguishing Buna S treads from those of natural rubber in a series of captured tires submitted for physical testings.

Shore creep is primarily a relaxation of strain, but does involve an accompanying decrease in applied stress. In extending the study of stress relaxation with time to greater deformations than those involved in hardness testing, elongations were maintained constant. In Table 1 are summarized the relaxations in stress (in p.s.i.) of a natural rubber and GR-S treads when stretched to various elongations.

TABLE 1. STRESS RELAXATION OF NATURAL RUBBER AND GR-S TREAD STOCKS

% Elongation	Relaxation in Stress (P.S.I.) Nat. Rubber Tread	Relaxation in Stress (P.S.I.) GR-S Tread	Time of Relaxation Min.	Condition of Test ° F.
100%	100	135	30	80
400%	735	670	30	80
400% ± 10%	670	600	30	80 with jiggle*
100%	135	150	30	130
200%	200	235	30	130
300%	400	335	30	130
400%	600	535	5†	130

* A mean elongation of 400% was maintained, but the specimen was jiggled between 390% and 410% elongation at a frequency of 350 cycles per minute.
† GR-S sample broke at five minutes.

There is a definite indication that both at room temperature (80° F.) and at even a slightly elevated temperature there is a reversal in the relative amounts of relaxation, i.e., at low elongations GR-S relaxes more, but at the higher elongations it relaxes less. These data, particularly at 400% elongation, suggest a relative tightening or shortening of GR-S at higher elongations, particularly when hot. The effects shown were not of the order of difference between GR-S and natural rubber when tested for flex crack growth and heat embrittlement where GR-S rates only from about 2% to 30% of natural rubber.

In the case of a flex cut growing in a running tire tread the conditions are widely different from those of the above test. The element of rubber at the apex of the tear is stretched and relaxed during about one-sixth of the revolution of the wheel and is then allowed to recover for the other five-sixths of the revolution. In a tire as a whole, the degree of deformation is limited by the relative inextensibility of the carcass cords and within these limits is controlled by load and inflation pressure. It is of low amplitude corresponding probably to not more than about 50% elongation. However for the element of rubber being abraded or chunked out and for the element undergoing tear at the apex of a flex cut, the deformation must reach that of rupture.

This, therefore, called for a study of the stress-strain properties of flexed rubber where the maximum amplitude of extension is increased to near rupture.

Hysteresis at Higher Elongations

Resource was had to the much disparaged hysteresis loop determined on a tensile testing machine with jaws moving 18 inches per minute. This is far from the rate of movement in a tire, but it does remove the stress completely as in a rolling tire, and its slow speed may be assumed to compensate somewhat for the fact that, as pointed out, the rubber in the tire is free to recover under its own retractive forces for five-sixths of the time of the complete cycle.

A typical set of hysteresis loops for natural and GR-S treads is shown in Figure 1. The maximum elongation of the loop is increased up to 400%. Approximate equilibrium was reached in 10 cycles. At 50% elongation GR-S shows 35% more hysteresis than does natural

[1] Reprinted from *Journal of Applied Physics*, Apr., 1944.
[2] Columbian Carbon Co., research laboratories, Brooklyn, N. Y.
[3] Bibliography references are listed at end of this article.

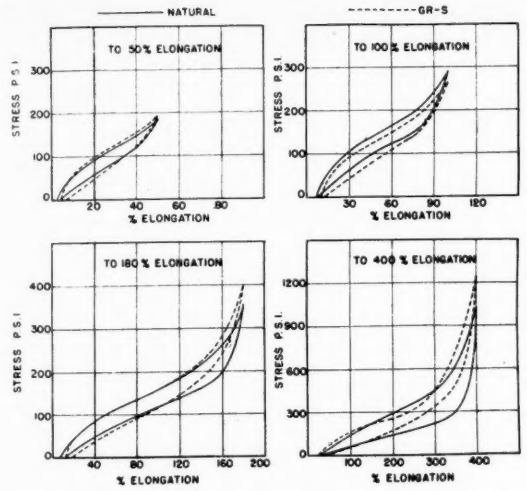

Fig. 1. Hysteresis Loops: Natural Rubber and GR-S Treads (Tenth Loop)

rubber. At about 100% elongation it has the same hysteresis, and at 400% elongation GR-S actually has only about 80% of the hysteresis of natural rubber (Figure 2).

This fact in itself is not new, having been disclosed by Rohde (20) in 1939. In this case the determinations were made to fixed stress, and it was shown that rubber relaxed much more, i.e., stretched much farther under repeated cycles as well as showing more hysteresis at the higher stresses than did Buna S (Figure 3—from Rohde).

There thus appears to be a contradiction between laboratory testing and road service as pointed out by Sebrell and Dinsmore (21) in 1941 who commented on Rohde's work as follows:

> Hysteresis loops, secured in the normal manner with a tensile testing machine, indicated that after ten cycles, the energy loss for a natural rubber tread stock was about six times as great as for a Buna S tread. In actual tests on tires, the Buna S tread, however, did not run at a lower temperature when compared with the natural rubber tread.
>
> Hysteresis loops were then obtained for various ranges of elongation. It was found that, for the tread stocks tested, natural rubber was superior in elasticity and work capacity for tensile stresses below 35 kg. per sq. cm. Only above this stress was Buna S superior. Consequently, this advantage did not show up when the stocks were employed as tire treads.
>
> In the same vein, many of the apparently contradictory test results for synthetic rubbers will probably, at some future time, find a logical explanation.

Stress Relaxation with Flexing

It is believed that the present approach, *viz.*, a study of the effect of increasing strain on the stresses developed in flexed rubber, will resolve this apparent contradiction. If, instead of showing the increase in strain with repeated flexing as Rohde did, the resultant stresses to the various elongations are plotted against the number of flexings (Figure 4) it is seen that for elongations below 100 to 150% elongation both rubbers relax to about the same degree. At 180% elongation, although the natural rubber had the higher initial stress or modulus, even at the second cycle, it had softened more than the GR-S. At 400% elongation, however, this difference is much greater so that at equilibrium the GR-S tread, instead of being 500 pounds lower in modulus, is now 200 pounds higher in modulus than is the natural rubber tread. This is summarized in Figure 5. Translating this into performance in a tire, it is seen that if an element of tread rubber is strained repeatedly to about 400% elongation, the GR-S will develop a higher opposing stress than does the natural rubber tire. A flex cut in this region is therefore pulled open with greater force.

Further, to illustrate this phenomenon, a series of dumbbell test samples cut from test sheets of tread-type

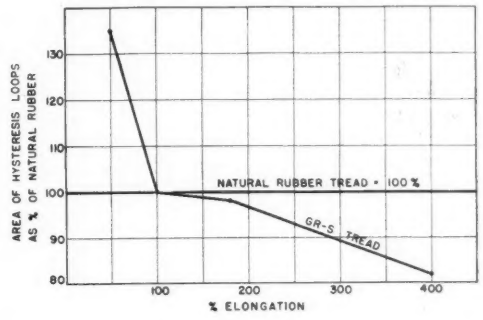

Fig. 2. Effect of Elongation on Hysteresis of GR-S and Natural Rubber

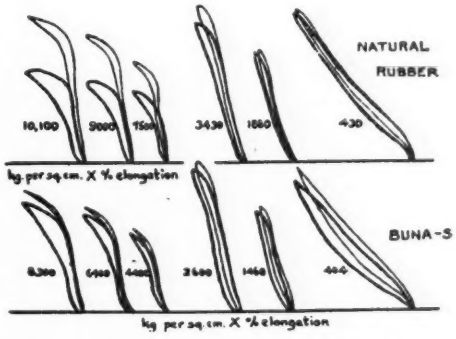

Fig. 3. Comparison of Hysteresis of Buna S and Natural Rubber with Increase in Energy Absorbed (20)

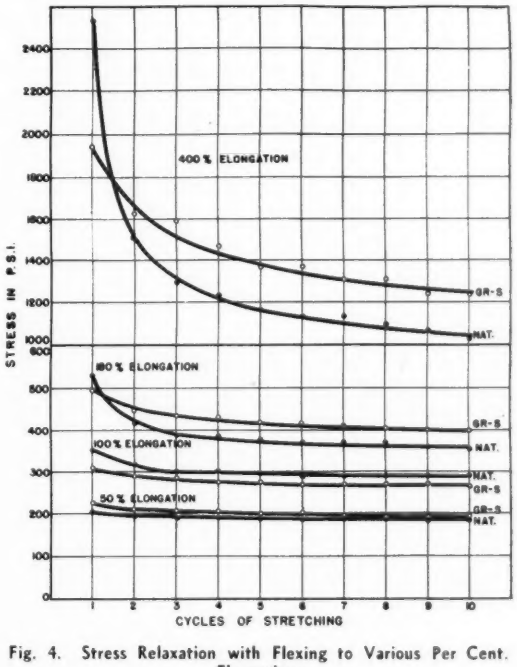

Fig. 4. Stress Relaxation with Flexing to Various Per Cent. Elongations

compounds were stretched to 400% elongation and allowed to return to zero stress 10 times at a jaw separation and return rate of 18 inches per minute. They were then promptly put into a Scott tensile tester, and stress-strain curves were generated, using the original bench marks. The stress-strain curves for the unflexed rubbers were also generated.

Figure 6 shows the stress-strain curves of the natural rubber tread before and after the 10 flexings to 400% elongation described above. It will be noted that until severe overcures are reached the effect is the equivalent of an extra elongation of about 100% for all but the lowest stresses. This is generally described as due to subpermanent set, and it might be argued that new bench marks should be made after the flexing. However the curves, as they stand, give a truer picture of the performance of the various tread elements.

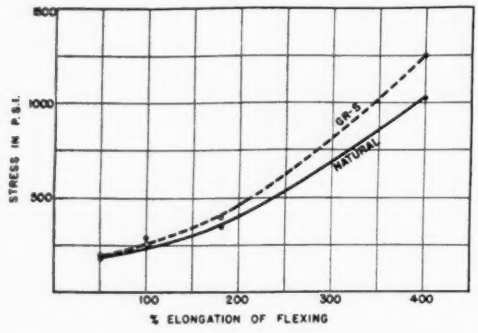

Fig. 5. Effect of Elongation on Stress after Flexing

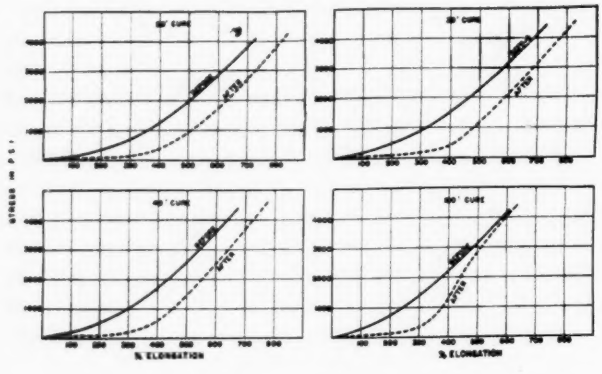

Fig. 6. Stress Strain Curves—Natural Rubber Tread before and after 10 Flexings to 400% Elongation

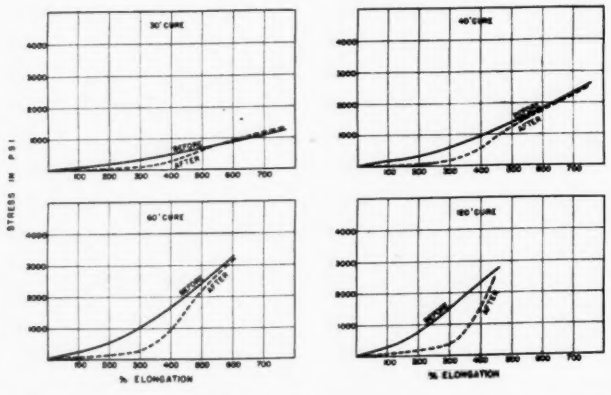

Fig. 7. Stress Strain Curves—GR-S Treads before and after 10 Flexings to 400% Elongation

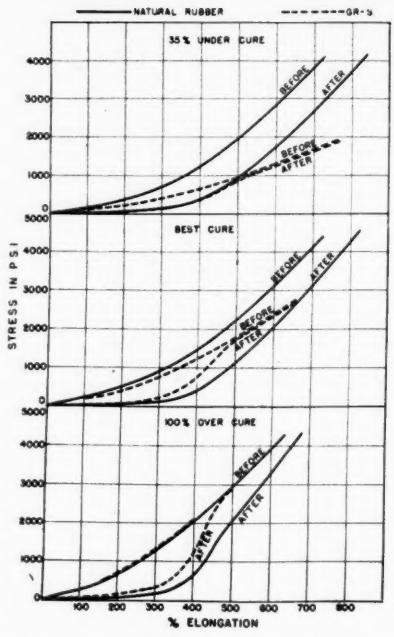

Fig. 8. Effect of 10 Flexings to 400% Elongation on GR-S and Natural Rubber Treads at Comparable Cures

It is seen that after flexing to 400% elongation the natural rubber becomes softer, its breaking elongation has increased by 100%, and its breaking tensile has increased measurably. At severe overcures this softening due to flexing is not so great for the higher elongations. (Best cure for this compound was 30 minutes at 280° F.)

In Figure 7 is shown a similar series of curves for the GR-S tread. Only at the lower elongations do the flexings to 400% have a softening effect, but at 500% elongation and beyond, the "flexed" stress-strain curves coincide with the originals. This is true for all cures starting with a bad undercure. (Best cure for the compound was 45 minutes at 280° F.)

In Figure 8 the data of Figures 6 and 7 are regraphed to facilitate comparison of the two rubbers at comparable states of cure, both before and after flexing.

At the 35% undercure the flexed GR-S builds up no more stress with elongation than does natural rubber. This is in agreement with road experience which has shown better cut growth performance for tires cured to the under side. Unfortunately their heat build-up at low elongations is excessive.

At best cures the stress-strain curves, before flexing, indicate that the GR-S tread is softer, but after flexing the relative positions are reversed, and GR-S, under forced vibrations beyond 300%, builds up more resistance than does natural rubber. This confirms the inference from the hysteresis loops to 400% elongation, shown in Figure 1, where both the extension and retraction arms of the GR-S loop lie higher than for natural rubber.

Because of the lower hysteresis of GR-S at the higher elongations, it relaxes less than natural rubber. On both the extension and retraction cycles the developed stresses are greater. When these occur at a flex cut, they increase greatly the total force on the element of rubber at the apex of the cut. This relaxation-failure effect of GR-S acts as a lever to multiply the force at the apex of the cut. At ordinary or room temperatures GR-S treads have a

tensile strength about 60% of similarly reenforced natural rubber treads, but a flex life rating of only about 10%. The relaxation-failure effect is thus the equivalent of a 6 to 1 leverage. These factors, coupled with the higher heat build-up of GR-S under flexures of small amplitude and its high negative coefficient of tensile strength, all contribute to the acceleration of cut growth.

At the overcures the relative stiffness of the flexed GR-S is again pronounced and is accompanied by a serious drop in breaking tensile and elongation so that the bad flex performance of overcured GR-S is understandable.

In 1934, Busse (*22*) considered "the tearing of an ideal, highly elastic medium that remains isotropic when stretched . . ." For this ideal elastic ". . . if any force *F* applied to the grips is great enough to start a tear, it is more than enough to make it continue across the sample. However, this is not true in general with rubber." In illustrating the differences in strain distribution of pure gum *Hevea* samples, when they were cut before and after stretching, it is shown that owing to relaxation the stresses in the stretched and relaxed sample do not build up to a maximum at the cut as they do in the unrelaxed sample, but are substantially equal to that prevailing across the uncut portion of the sample.

By analogy GR-S thus approximates the ideal elastic described by Busse more nearly than does natural rubber in the region of strain antecedent to tear or rupture, i.e., it is more elastic at high elongations.

This inversion of elasticity of GR-S presents a unique challenge to the polymer chemist who has made it and to the rubber technologist who must compound it. Its hysteresis at low elongations must be reduced so that tires will run cooler, but at the same time its hysteresis at higher elongations must be increased so that it will relax under these higher amplitude flexures and so prevent premature flex-cut failure.

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(20) E. Rohde, *Kautschuk*, 15, 64 (1939); *Rubber Chem. Tech.*, 12, 799-804 (1939).
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Du Pont Plastometer

(*Continued from page 175*)

is approximately one-half the radius of the compressed pellet. This figure in thousandths of an inch is recorded as the recovery figure. The difference between the recovery figure and the plasticity figure is known as the recovery. To insure continuity of operation two stop watches are used in the running of this test, and extreme care is exercised in the timing and manipulation of the plastometer.

The reproducibility of test results obtained with the modified Williams plastometer is shown by the following data. Test pellets were taken from a batch of uncompounded Neoprene Type GN (GR-M) following a mechanical breakdown for six minutes on a 30-inch mill. The surface temperature of the rolls was 70° C., and the distance between the rolls was 0.060-inch.

Pellet No.	Plasticity Figure	Recovery Figure	Recovery
1	117	125	8
2	118	125	7
3	117	124	7
4	117	125	8
5	118	125	7
6	117	124	7

Under normal conditions only two pellets are used for each test, but if the plasticity or recovery figures of the two pellets do not check within 5%, the third pellet is tested.

Recent Russian Literature

(*Continued from page 177*)

Latex Mixtures in the U. S. A. M. V. Serikov, *Kauchuk i Rezina*, 3, 95-97 (1939). **N-12.**

This paper reviews the work of the American Anode in Akron, O.

Synthetic Rubber in the Capitalist Countries. E. S. Savinskii, *Kauchuk i Rezina*, 3, 100-105 (1939). **S-29.**

A review of the synthetic rubber industry in Germany, Japan, Italy, Belgium, Poland, U. S. A., and England, taken mostly from the journals of the United States, England, and Germany, is given.

Heat Generation in Rubber. N. N. Mikhailov and S. E. Polyak, *Kauchuk i Rezina*, 4/5, 27-38 (1939). **SN-33.**

A new apparatus for measuring the heat generated in rubber under the influence of periodic deformation is described. The results of a test are recorded automatically on photographic material. The elliptical curves obtained are then analyzed mathematically. Details of the apparatus and the mathematical analysis of the curves are explained. Measurements made on this apparatus are not affected by the size of the specimen, static load, amplitude of vibration, previous fatigue of the rubber, or the fatigue during the test. The results determined with this apparatus depend only on the nature of the tested rubber. In favorable circumstances the relative error of a series of determinations does not exceed 3%; in unfavorable conditions it may reach up to 10%.

Vulcanization in Liquid Medium. I. A. Belen'skiĭ, D. L. Margolin, and V. I. Yudin, *Kauchuk i Rezina*, 4/5, 39-41 (1939). **SN-34.**

Experiments were conducted on vulcanizing rubber in liquid medium. As liquid was used glycerine heated to the required temperature and kept hot between successive batches so that no time was lost for reheating. After successful laboratory tests this method was tried on a semi-industrial scale with very satisfactory results. The method was tried on galoshes. Mechanical tests of the liquid-vulcanized product gave good results. A layout is being built for a continuous operation of the vulcanizing process in liquid.

(*To be continued*)

EDITORIALS

Alcohol and Synthetic Rubber

A GREAT deal of credit has been given to those responsible for the design, construction, and operation of the government plants for the production of butadiene from ethyl alcohol. Without detracting from the achievement represented by the successful completion and greater than capacity operation of these plants, the equally great contribution of the producers of ethyl alcohol in meeting the requirements for this essential raw material, which in 1943 were twice the requirements in 1942 and in 1944 are estimated as being three times those in 1942, should not be overlooked.

In a recent statement, Walter G. Whitman, assistant director of the Chemicals Division of the War Production Board, said: "It is fair to regard the rubber manufactured to date as being almost solely the product of the beverage distilling industry. Synthetic rubber is many months ahead of where it could have been if alcohol had not been available for butadiene production, and in my estimation the tremendous contribution of distillers' industrial alcohol to the synthetic rubber program has not received the recognition which it deserves."

Continued concern is being expressed in many quarters regarding the problems that may arise on the home front if the War Production Board does not permit the distillation of alcohol for beverage purposes some time during the present year. In this connection the War Production Board states that serious alcohol problems are ahead for 1944 since the total requirements estimated at 630,000,000 gallons, of which more than one-half are for the rubber program, can only be met if all producing facilities and the new plants now coming into operation run at full speed, and even then some withdrawals from the stockpile will also be necessary. It would appear from these facts that any means by which additional new production of alcohol could be obtained within a reasonable time, and more particularly if this new production could be obtained at a lower cost both now and in the future, should receive support and approval from the War Production Board and especially from the Office of the Rubber Director.

A plant to produce alcohol from sulphite waste liquor is under construction in Bellingham, Wash., but even after a thorough investigation and approval by the Chemicals Division of the WPB and a tentative approval by Chairman Donald Nelson, himself, the Requirements Committee of the WPB has recently refused approval for the construction of two new projects, one to produce alcohol from wood wastes and the other to use inedible sweet potatoes, because of manpower and material shortages. The first project which was to have been constructed at Springfield, Ore., and the second at Clewiston, Fla., would have produced 11,100,000 gallons of ethyl alcohol annually from industrial and agricultural wastes and therefore at a reduced cost. Two of the materials of construction for these plants, steel and copper, are actually more available than they have been for some time since 250,000 tons of idle and excess stocks of steel are listed with regional offices of the WPB, and restrictions on copper and copper-base alloy have recently been eased. Much of the wartime construction of plants for synthetic rubber, aviation gasoline, and other major industrial projects has or soon will be completed, and some manpower of this type should be available for this work.

Here is a situation in which both the synthetic rubber producing and consuming industries should take an active interest. In view of the possibilities of these new processes in lowering the cost and providing an alternate source of synthetic rubber raw material, a more complete and detailed explanation of the reasons for this WPB Requirements Committee action should be requested.

Guayule "Insurance" Policy to Lapse?

ALTHOUGH the House Appropriations Committee on March 21 recommended that the U. S. Emergency Rubber Project for guayule rubber be liquidated during the coming fiscal year since "this project will not achieve results in time to be of material advantage to the war effort," prospects for the continuation of this program now look brighter, following the arguments in its favor presented before a special Senate Agricultural Subcommittee on April 20 by Rubber Director Bradley Dewey, G. R. Salmond, of the Department of Agriculture Forest Service, and Congressman W. R. Poage of Texas.

It is possible that this ill-advised action of the House Appropriations Committee may be neutralized and the guayule project carried through to completion in a manner so that the $33,000,000 already spent will not be wasted if leading figures in the rubber industry as well as the Rubber Director will do everything possible to explain to both the House and Senate committees involved the real necessity of husbanding all of our available sources of natural rubber, not only during 1944, but in all probability for several additional years. The facts of the case are that if all of the 32,000 acres of guayule shrub now planted are harvested this year, we will secure only 1,500 tons of rubber, but by waiting until 1945 we will secure 6,400 tons, 14,000 tons in 1946, 22,000 tons in 1947, and 28,000 tons in 1948. These totals are accumulative and do not mean that we will not secure any rubber until 1947 or 1948 if the longer and more efficient harvesting procedure is used, but the difference between the total tonnage of 1,500 in 1944 and 28,000 in 1948 is about the equivalent of "plowing under" or "not plowing under" guayule rubber growing in this country. Under these circumstances every effort should be made to see that a misguided sense of economy by the House Appropriations Committee does not cost us many times the equivalent of the money this committee is trying to save.

Scientific and Technical Activities

Boston Group Regional Industry Meeting Well Attended

THE spring meeting of the Boston Rubber Group, held this year in cooperation with the rubber industry of New England in the main ballroom of the Hotel Statler in Boston, Mass., on April 14 to hear Rubber Director Bradley Dewey talk on "Synthetic Rubber", was attended by more than 800 persons. The present chairman of the Boston Group, Joseph L. Haas, of Hodgman Rubber Co., and his committee of leading executives from the regional rubber industry and past and present officers of the Group deserve much credit for the success of this special meeting.

Following his introductory remarks, Chairman Haas presented John M. Bierer, of the Boston Woven Hose & Rubber Co., as a man well known to the rubber industry and as the oldest living past chairman of the Boston Group, who acted as toastmaster. After dinner Mr. Bierer introduced guests consisting of rubber industry heads, officers of the Division of Rubber Chemistry, A. C. S., representatives of the Office of the Rubber Director, and representatives of other local rubber groups, who were seated at or near the speaker's table. Mr. Bierer then briefly described developments in the rubber industry during its relatively short existence of about 105 years, up to and including the recent achievement of establishing our large synthetic rubber producing industry during the past two years. Among the contributions of New England to the progress of the rubber industry both past and present, it was mentioned that two of the three Rubber Directors during this war, Arthur Newhall and Colonel Dewey, were from that part of the country. Mr. Bierer concluded his remarks with the introduction of Rubber Director Dewey.

Colonel Dewey divided his talk into two parts, the first of which consisted of a showing and explanation of numerous slides of the construction and operation of the many plants in the government program which are producing the synthetic rubber raw materials and finally the actual synthetic rubber, and the second part of which was concerned with answering questions from the audience. The first slides were so selected that they provided a definite demonstration of the immensity and complexity of the program, after which slides were shown with the purpose of trying to give a better understanding of the whole undertaking by describing separately some of the component parts.

"The present period is still a serious one for a nation like ours whose economy and whose war effort are geared to rubber," Colonel Dewey said in discussing the synthetic rubber program. "No one will deny that vital military programs come first and in the case of some finished rubber goods used by the military, particularly large heavy-duty tires, a shortage of up to 25% now exists. Essential civilian transportation must also be maintained."

This situation exists despite the fact that this country is now producing synthetic rubber at a rate greater than that at which rubber was consumed in any prewar year, the Rubber Director declared, in giving figures for the production of all synthetic rubbers in the first quarter of 1944 as 166,550 long tons, as against an estimate of 166,500 long tons given in Progress Report No. 4 in October, 1943. The problem today is to make good rubber products from the present synthetic rubbers while at the same time searching for new synthetics that might be superior to those now being made. The Rubber Director requested his audience to continue to emphasize the necessity of tire conservation by civilians since essential tire uses were so tremendous that no tires can be available for pleasure driving for some time to come.

During a period following the presentation of the more formal part of his talk, Colonel Dewey answered questions on many aspects of the synthetic rubber program. Concerning lack of uniformity of different lots of the synthetic rubbers, it was said that this was undoubtedly due mostly to a small amount of understandable and unavoidable failure on the part of men and equipment and to the newness of the art of making synthetic rubber. Rapid progress is being made in learning the causes of lack of uniformity and eliminating them. A new and better GR-S may need new and better monomers, and it was for the purpose of preparing new types of synthetic rubbers and evaluating them that the government laboratory and pilot plant was being built at Akron, the Rubber Director stated. Research on government synthetic rubbers would continue in this laboratory after the war, and the hope was expressed that some means might be found by which private industry might take over the responsibility for this research and this laboratory. Questioned on the minimum cost of GR-S and its future in competition with crude natural rubber after the war, Mr. Dewey said he felt that GR-S could be produced at a small profit for from 13 to 14¢ a pound and that the greater volume of demand for rubber in the postwar would result in an economic balance between the use of natural rubber and synthetic rubber so that it would be necessary to operate at least 40 to 50% of the present synthetic plants even if natural rubber were sold at 10¢ a pound.

The Rubber Director, a native of New England, in conclusion expressed confidence that, "This section of the country, where 24,500 of a national total of 207,000 people, or 12%, are employed in the rubber manufacturing industry, will continue to cooperate 100% in production and conservation. The Armed Forces must be supplied in vast quantities with the infinite number of rubber products necessary to wage war. Essential civilian activities on the home front that count on rubber must continue to serve the nation, and there must be some rubber products available to civilians."

New York Rubber Group Meeting

A MEETING of the New York Rubber Group was held at the Building Trades Club, 2 Park Ave., New York, N. Y., March 31. This dinner-meeting was attended by about 300 members and guests, who heard talks by R. D. Young, of the Rubber Trade Association of New York and formerly vice president of the Rubber Reserve Co., and J. W. Bicknell, vice president of the Rubber Development Corp., Washington, D. C. An official Navy Department film entitled "War on the Seas" showing battle actions from Pearl Harbor to the Gilbert Islands concluded the program.

Mr. Young reviewed the activities of Rubber Reserve from 1940 to date, with emphasis on the work done in building up our natural rubber stockpile to a total of more than 600,000 long tons in April, 1942. He revealed that early in 1941 an agreement was made by Rubber Reserve with the various steamship companies whereby 75,000 tons of cargo space on ships returning from the Far East was allotted to and paid for by Rubber Reserve whether or not the space was used. He said that he felt that this arrangement had been a very important step in helping to build up our stockpile so rapidly. The part played by the Rubber Reserve Co. in the national scrap rubber drive of 1942 was mentioned, and tribute was paid to the four scrap rubber dealers, Loewenthal Co., A. Schulman, Inc., H. Muehlstein & Co., Inc., and Nat. E. Berzen, Inc., who as agents of Rubber Reserve, contributed so much in the handling of the million tons of scrap rubber collected in about a six months period, and to W. J. McCauley, chief of the scrap rubber section of Rubber Reserve Co. and now president of the Muehlstein company. The production "miracle" of building our great synthetic rubber industry in the short space of two years was referred to, and the present-day problems of effectively using this newly acquired volume of synthetic rubber were described briefly.

Mr. Young said that demands for rubber for two or three years after the war would probably be tremendous, and there was a possibility that appreciable amounts of synthetic rubber might be exported from this country. He believes that the plantations in the Far East have not suffered much damage except for the mechanical equipment destroyed, which in turn may mean that the first rubber obtained from them after the war will suffer mainly because of lack of cleanliness. He feels that the European estates will be devoted to the production of specialty types in the postwar period with the volume production being supplied by the native producers. It was emphasized that the United States now occupied a much different, but much stronger position as regards rubber in that we are now the largest producer as well as the largest consumer of a very important raw material. Mr. Young concluded with the remark that when one reviews the rubber situation from 1940 up to the present, one of the most important facts that becomes apparent is how fortunate we were that the Japanese did not attack Pearl Harbor on December 7, 1940.

The imports of natural rubber into the United States in 1939, 1940, 1941, and 1942 were given by J. W. Bicknell at the beginning of his talk to illustrate rapidity of our change from "have" to a "have not" nation as far as this important commodity was concerned. He stressed the point brought out in the latest report of the Rubber Director that we might have 55,000 long tons of natural rubber at the end of 1944, if we are successful in importing the 90,000 long tons during 1944 estimated by the Rubber Director. Mr. Bicknell said he felt we would obtain the 90,000 tons, one-half of which would come from countries with

which the Rubber Development Corp. had working agreements and one-half to be obtained from sources under control of the British. He then reviewed briefly the work of procuring rubber from South America and mentioned the two schools of thought in existence from the start of this effort regarding how best to go about getting the most rubber. He said the method of paying a high price and leaving it up to the various South American countries to produce the rubber had not been followed in most cases in the beginning because the necessity of supplying equipment, contributing funds for transport facilities, labor, and food to rejuvenate the almost extinct rubber industry in South America seemed the better way. Events have since indicated that this latter method interfered too much with trade in these countries, particularly in Brazil, and he then referred to the recent changes in our agreements with that country by which Brazil was to be paid a high price for the rubber produced, but the details of getting the rubber were to be left to the Brazilians. Agreements with fifteen other South American countries had been similar, but not so extensive as the original agreement with Brazil, and the matter of producing the rubber had been left more in the hands of private operators, and the results to date had been quite good. The question of natural *versus* synthetic rubber in the postwar will be settled on the merits of the case, this speaker concluded.

Chairman Fred Conover, who presided at the meeting, suggested that a motion be made that the secretary of the Group be instructed to send an expression of sympathy to the wife and family of Bevis Longstreth, whose death occurred recently. Such a motion was made and passed. The chairman also introduced to the audience Richard Baybutt, recently elected vice president of Rubber Reserve, and J. A. Truslow, also recently elected vice president of Rubber Development, who were present at the meeting.

The chairman of the local committee on arrangements for the spring meeting of the Division of Rubber Chemistry, A. C. S., Harry Outcault, spoke briefly on the progress being made for this meeting and again emphasized the desirability of advance registration for those planning to attend. Since the meeting is being held as this issue of INDIA RUBBER WORLD goes to press, a report of the happenings will have to be delayed until our June issue. Abstracts of the papers presented and other information concerning the Division meeting appeared in our April issue.

A. C. S. Cleveland Meeting Papers

A SYMPOSIUM on the theory of long-range elasticity was held as a part of the program on the Division of Physical and Inorganic Chemistry at the one hundred and seventh meeting of the American Chemical Society, held in Cleveland, O., from April 3 to 7. The symposium gathering presided over by M. L. Huggins, of Eastman Kodak Co., heard a paper by Frederick T. Wall, of the University of Illinois, on the "Statistical Thermodynamics of Rubber", in which the equation of state for simple stretch and the equation for the shearing moment for rubber subject to pure shear were given, and it was concluded that rubber should obey Hooke's law with respect to shear. Hubert M. James, of Massachusetts Institute of Technology, presented a paper on "Molecular Weight in the Network Theory of Rubber", which stated that reliable estimates of the molecular weight of rubber should be based on a theory of network formation. Paul J. Flory, of the research laboratory of the Goodyear Tire & Rubber Co., discussed "Network Structure and Physical Properties of Vulcanized Rubber." Equations were derived which represented the dependence of equilibrium swelling of rubber in solvents on number of cross-linkages, effect of swelling on elastic modulus, and effect of extension on equilibrium swelling. It was reported that the effect of finite molecular weight on physical properties could be introduced into the various equations.

Cheves Walling, of United States Rubber Co., also gave a paper before the Division of Physical and Inorganic Chemistry, on "The Polymerization of Styrene in Phenolic Solvents." The work reported was interpreted on the basis that the polymerization of styrene in phenolic solvents proceeds through a free radical type of active center, but that the active center readily undergoes chain transfer with the phenol to yield radicals which cannot easily start new chains.

Gustav Egloff and George Hulla, of the Universal Oil Products Co., discussed in their paper before the Division of Organic Chemistry the "Conversion of Hydrocarbons into Butadiene-1,3." This paper stated that all ordinary hydrocarbons can be converted into butadiene-1,3, in yields varying from traces to 100%, according to their structure, and gave a survey of the underlying processes. Other papers having to do with the production of synthetic rubber raw materials were offered by G. L. Sumner, Jr., and Lloyd Berg, of Gulf Research & Development Co., on "The Pyrolysis of Cyclohexane" and by Donald F. Othmer and others, of the Polytechnic Institute of Brooklyn, on "Systems Used in the Manufacture of Butylene Glycol Diacetate from 2,3-Butylene Glycol." F. E. Cislak, of Reilly Tar & Chemical Corp., presented an interesting paper on "Coal-Tar Bases, Their Chemistry and Properties", and J. B. Glenn, of the Pan American Trust Co., made some pertinent observations in his paper on "The Outlook for Foreign Trade." All of these latter papers were given before the Division of Industrial and Engineering Chemistry.

Fall Meeting Date Set

The Society has scheduled its next meeting for the week of September 10, to be held at the Hotel Pennsylvania, New York, N. Y. Sessions of the Division of Rubber Chemistry, however, will again take place at the Hotel Commodore, September 13, 14, and 15.

U. S. Rubber Night at L. A.

THE regular monthly meeting of Los Angeles Rubber Group, Inc., which was sponsored by the United States Rubber Co., was held April 4 at the Mayfair Hotel, Los Angeles, Calif., with about 140 members and guests present. Music during dinner was furnished by Jan Jacobson at the piano. Chairman A. L. Pickard introduced all the guests not connected with U. S. Rubber; then several new members: Clark Barrett, E. F. Tompkins, E. L. Kuehl, Tony Reznicek, and W. H. Johnston were introduced and questioned by T. Kirk Hill.

Seymour Hull, of U. S. Rubber, acting as program chairman for the evening, made a few remarks, after which he presented J. M. Miller, factory manager of the company's Los Angeles plant, who had been chosen toastmaster. Mr. Miller introduced some 45 representatives of his company, who were attending the meeting, and then presented Brig. General D. F. Stace, District Supervisor, AAF Material Command, Western District. General Stace spoke briefly on his close association with the rubber companies in the Los Angeles area and paid tribute to their cooperation in responding to the ever-changing specifications and demands of the Air Corps. An authentic war film, "The Battle for the Beaches", followed General Stace's remarks.

The speaker of the evening, Fredrick P. Woellner, professor of education at U. C. L. A., was then introduced by Mr. Miller, who also gave an interesting résumé of Dr. Woellner's background. The subject of Dr. Woellner's talk was "The American Way", and he compared the American standards of living and thinking and those of European countries. He pointed out that there were thousands of city, county, state, and federal laws passed every year, and for every law there had to be enforcement machinery, as a direct or indirect result of which there were in excess of nine million persons enjoying a living at the "public trough." Comparing the reactions of the European peoples under dictators to the possible reactions of Americans under that form of government, Dr. Woellner concluded that all men are not born equal, that no nation comes out of a war the same as it goes in, and since America has grown from nothing to the leading country in the world in the short space of 150 years, it is up to us to decide whether or not we continue the American Way of Life or submit to a European importation.

It was announced that the Group golf tournament would be held at the Southern California Golf & Country Club on April 18, and the date tentatively set for the summer outing was given as July 22 and 23. April 11 was reported as the date when donors from the Group would make their contributions to the Red Cross blood bank.

The last item on the program was the awarding of prizes, which was handled by Seymour Hull. The door prize, a $25 War Bond, donated by the Dill Mfg. Co., went to Allan Moore, of Commercial Rubber Co. A. R. Hromatka, official photographer for the Group, donated two framed photographs of California scenery, which were won by F. E. Geisel, of Northrup Aviation, and Bill Orth, of C. J. Tagliabue Corp. Other prizes donated by U. S. Rubber were won as follows: a tan leather brief case, to Alvin Reibel, of Kirkhill Rubber; a leather covered poker chip set to Mr. Miller, of Miller Gasket Co.; a work organizer, to Harry Friedman, of Commercial Rubber; and a pipe rack to Ken Courtois, of U. S. Rubber Co.

Elections for Chicago Group

ANNUAL election of officers is the main business scheduled for the May 19 meeting of the Chicago Rubber Group to be held in the Terrace Casino of the Morrison Hotel, Chicago, Ill. Dinner will be served at 6:30 p.m. Other attractions on the program are Ira Williams, of J. M. Huber, Inc., who will discuss the research aspects of synthetic rubbers from the viewpoints of their raw materials production and use; and H. Walter Grote, of Wilmington Chemical Corp., who will present a demonstration of thought reading and subliminal control.

Rhode Island Rubber Club Discusses Plasticizers

THE spring dinner meeting of the Rhode Island Rubber Club, held Friday, March 24, at the Crown Hotel in Providence, was also somewhat of a special event for this organization since it marked its tenth anniversary. Tribute was paid to the club by the Shell Oil Co. in its evening radio broadcast. The audience of about 100 enjoyed a symposium discussion on "Plasticizers" led by manufacturers' representatives of some of the generally available types in use at the present time. This is the second such session sponsored by the Rhode Island Club; the first on "Synthetic Rubbers" was the feature of the winter meeting. Both have attracted considerable interest.

The most detailed talks were given by A. J. Simoncic, of Shell Oil, on Dutrex 6 plasticizer and by Ralph B. Symons, E. F. Drew & Co., Inc., on his firm's work with low-temperature plasticizers. Shell's Dutrex 6 was described as a high-molecular weight hydrocarbon softener and extender, fully compatible at all loadings with both GR-S and natural rubber and having very little effect on tensile strength up to quite high loadings. Owing to its unsaturated nature, Dutrex 6 is sulphur reactive, requiring approximately the same amount of sulphur as GR-S when used as an extender for the latter. In addition to its straight plasticizing action, it imparts desirable tack to GR-S compounds and also produces stocks that extrude smoothly. It was mentioned that full details on the physical and chemical properties of Dutrex 6 and on its performance in compounding and processing are available in published form from the Shell Oil Co.

The general requirements for a low-temperature plasticizer were described by Mr. Symons, who also summarized the extent to which available materials met these compounding needs. Properties which a good low-temperature plasticizer should possess were given as: (1) ability to maintain compound flexibility to extreme low temperature levels; (2) low volatility and ability to maintain substantially unchanged stock characteristics through normal and up to quite high temperature levels; (3) compatability with all synthetic rubbers and the more important flexible plastics; (4) not appreciably weaken tensile strength; and (5), if possible, low extractability and not affect the electrical properties of the material with which it is used. The Drew company's S. C. plasticizer was characterized as meeting very easily all the requirements from (1) through (4), but in common with all other low-temperature plasticizers, it did not meet the requirements of (5) as well as might be desired. An added advantage of S. C. and some other plasticizers of this type is their ability to form eutectic mixtures when used in combination with plasticizers such as dibutyl sebacate. An additional lowering of the stiffening point of 7° to 8° F. can be achieved by this means, it was stated. Further, a good tight cure is necessary to obtain maximum low-temperature flexibility, the lowest 15 degrees being dependent thereon.

Fritz S. Rostler, of Wilmington Chemical Co., pointed out that Naftolen was also a plasticizer of the unsatured hydrocarbon type and that full data have been offered to users in published articles and bulletins. He added the comment that a full, tight cure is necessary to counteract the tendency of these softeners to be extracted by oils and aromatic gasolines with which they may come in contact.

The use of naval stores plasticizers as filler wetting agents and tack producers was described by A. J. Puschin, of Thiokol Corp. An important property covered by this speaker was the manner in which plasticizers of this type retard the rate of cure by reason of their high acidity. He mentioned that this could be compensated for by increased accelerator content with resulting high tensile and freedom from scorchiness.

The discussion period brought out the fact that general practice calls for the use of liquid plasticizers in stocks where filler content is high and the use of solid plasticizers when little or no filler is present.

Geon Plastics Discussed

A REGULAR meeting of the Northern California Rubber Group was held March 30 at the Hotel Claremont, Berkeley, Calif., with some 71 members and guests in attendance. The program consisted of a talk by C. S. Brous, of the B. F. Goodrich Co., on Geon plastics and a showing of some slides illustrating the physical properties of various synthetic rubbers by Vic Vodra, of R. T. Vanderbilt Co.

Mr. Brous gave examples of typical compounds of varying plasticities from those in the essentially hard classification down to those in the soft sponge rubber group. It was pointed out that Geon plastics were not to be considered as a replacement for rubber, but rather as a supplement for rubber and other synthetic materials. The speaker explained that these new Geon plastics, which are comprised of various polyvinyl and polyvinylidene chloride polymers and copolymers may be combined with Hycar or other Buna N types of synthetic rubbers, with the result that the finished product may acquire some of the best qualities of each material. A discussion period followed Mr. Brous's talk.

Mr. Vodra's presentation which came next on the program, was followed by drawings for bottles of beverage donated by Monsanto Chemical Co. and won by L. S. Bengston, of Pacific Rubber & Tire Mfg. Co., and Charles Bean, of Bean Tire & Rubber Works. Another bottle, donated by the Goodyear Rubber Co., went to Frank Durbin, of Shell Chemical Co.

Palmer before Detroit Group

AT THE spring meeting of the Detroit Rubber & Plastics Group on April 21, H. F. Palmer, of the Firestone Tire & Rubber Co., who recently returned to that company after serving for two years on a loan basis with the Rubber Reserve Co., Washington, D. C., discussed the synthetic rubber program as it had appeared to him from his position as an administrative assistant with the government rubber agency. About 125 members and guests heard the talk, which followed a dinner meeting at the Detroit-Leland Hotel, Detroit, Mich.

Dr. Palmer prefaced his remarks with some personal reminiscences of his experiences as a newcomer to Washington in the early days of the war and then explained the organizational set-up of Rubber Reserve and its relation to other agencies. He presented statistics on the supply and demand picture for natural and synthetic rubber, as now estimated up to the end of 1944, and expressed confidence that the problem of synthetic production was reasonably well over the hump with respect both to amount and to uniformity of quality. He stated that the bottleneck in the rubber industry at the moment is the limited capacity of processing equipment, particularly in the tire factories. As to the future of the synthetic rubber industry, Dr. Palmer quoted Rubber Director Bradley Dewey's statement that even with natural rubber at 16¢ a pound, it would have plenty of competition from the synthetic rubbers. The speaker stated that large numbers of new or modified synthetic rubbers were being studied, but that he personally did not know of any which promised revolutionary advances in quality over the types now in use.

The meeting was concluded with a showing of several timely films, including action pictures from the various war fronts, together with a film illustrating production of synthetic rubber, shown through courtesy of the Firestone company.

Turnbull Discusses Plastics

THE last meeting of the Montreal Rubber & Plastics Division of the Society of Chemical Industry for the 1943-44 season was held April 14 at the Mount Royal Hotel, Montreal, P. Q., Canada. This meeting was held jointly with the Montreal Paint & Varnish Production Club and the Society of Plastics Industry. The speaker for the evening was J. R. Turnbull, assistant general sales manager of the Monsanto Chemical Co., who talked on "New Fields for Plastics and Resins."

Owing to accelerated research and development work, plastics have entered many new fields, he said. It was pointed out that care should be taken not to recommend plastics for applications in which they were not suitable, but many possible postwar uses for plastics in the automotive, refrigeration, and radio industries were suggested. To get a proper start in these industries after the war, it was emphasized that it is necessary that planning be started now. In this connection it is much easier to have a plastic adopted for the original design than to replace an approved material already in production, the speaker stated. Mr. Turnbull mentioned a number of recent developments in plastics, such as polydichlorostyrene, for use in high-frequency insulation, and X-200, a thermoplastic resin resistant to repeated boiling in water, both of which he felt will extend the successful application of plastics in industry.

It was announced that the following members had been elected to office for the 1944-45 season: R. V. V. Nicholls, McGill University, chairman; E. D. Bent, Northern Electric Co., vice chairman; and E. A. Thorne, Diamond State Fibre Co. of Canada, secretary-treasurer. Members of the executive committee are: J. D. Benedito, H. L. Blachford, W. B. Jonah, L. G. Gendron, N. W. Smith, George A. Lee, L. C. MacLeod, and H. Chauvin.

New Officers for Ontario Section

A MEETING of the Ontario Rubber Section of the Canadian Chemical Association was held in Toronto on March 29. Approximately 45 members and guests attended dinner, and about 80 went to the meeting which was held at the University of Toronto.

The speaker of the evening was Norman S. Grace, of Polymer Corp., Ltd., who

(Continued on page 234)

Supplementary Progress Report No. 5A

Impact of New Draft Policies upon Rubber Program

THE summary of Progress Report No. 5[1] of this Office, written early this month, stated:

"Everything pertaining to the rubber program is tight, but, with the continued active cooperation of the military, other government agencies and the civilian population in conserving rubber, and *subject to no untoward developments, particularly as to skilled and technically trained manpower* or shortages of essential products from allied programs, there will be sufficient synthetic rubbers for the manufacture of rubber products to supply the needs of war and our essential home front."

In the meantime a study of the effect upon the rubber program of the proposed cancellation of industrial deferments of all men less than 26 years of age caused me to state on March 18:

". . . unless steps are taken to stop the induction of skilled and technically trained men from the rubber program, we will be unable to meet anything like the estimates forecast in my report and will fall far short of making estimated requirements of heavy duty tires."

Since that time an up-to-the-minute exhaustive survey of the manpower used by the rubber program has been substantially completed and procedures have been announced which we are confident will permit of the program's presenting many of its major needs to the War Manpower Commission and through them to Selective Service in such a way that certain essential men having special qualifications will be kept where they are of maximum value to the war effort. The losses to be suffered and the gains incident to the saving of some key men are of such magnitude that without further elaboration of their effect, some of the conclusions of Progress Report No. 5 are quite meaningless.

For (1) the plants making synthetic rubber, (2) the principal plants in the rubber goods manufacturing and reclaim industries, and (3) a few making special rubber-making machinery, this Office is recommending the names of men who should be deferred. For the plants making essential materials upon which the success of the rubber program must of necessity depend, such as alcohol, carbon black, rubber chemicals and pigments, rayon and cotton tire cords, etc., the appropriate bureaus of War Production Board are responsible for recommending men whose loss would damage the rubber program.

The survey which has been made shows that in following the rules that have been laid down (by the Inter-Agency Committee on Occupational Deferments) the rubber program will lose many men under 26 years of age. Unless they are replaced with suitable new personnel, their loss will seriously harm parts of the rubber program. However, we will be able to retain men of specialized skills, knowledge, and educational qualifications necessary to the program and now in it. This will avoid the national disaster which would have resulted were these men taken.

Because of the varying ages of plants, their location and type of work and economic factors arising from different rates of pay in different localities, some plants are harder hit than others. No provision has been made as yet to provide the additional chemists and engineers that will be needed to man the pilot plants and projects now building or to replace the men who enlisted in the Armed Forces.

According to our present estimates the proposed cancellation of industrial deferments of men less than 26 years of age will take approximately 3% of the personnel from the rubber goods and reclaim rubber manufacturing industry and about 5% from the synthetic rubber manufacturing plants, leaving in these groups and plants making essential rubber processing machinery about 1,700 essential men less than 26 years of age, over two-thirds of whom are qualified chemists and engineers.

The accompanying Exhibits A and B[2] of this report show data as to the use of approximately 207,000 employes in 237 plants of the rubber goods and reclaim rubber manufacturing industry and 18,640 employes in 49 plants of the synthetic rubber manufacturing industry. It is estimated that these include more than 95% of the employment in these industries, and tentative lists of the names of most of the 1,700 essential men within these groups have been given to the Selective Service authorities together with the names of about 100 men for whom short-term deferments will be asked. The balance will be reported within a few days and, after another rescreening, special forms covering those finally recommended will be approved within a very few additional days.

In Exhibit A it is to be noted that 2,766 of the 6,251 men who are being made available to the Armed Forces are less than 22 years of age. Fairness to the industry demands reporting that less than 2% of these now have occupational deferments. The rubber goods manufacturing industry has already sent to the uniformed Armed Forces over 70,000 employes and has sent many men into government service in essential civilian capacities, not to speak of several thousand whom they have transferred to munitions and other non-rubber war production factories operated under its supervision.

TABLE 1 FROM EXHIBIT A. RUBBER GOODS MANUFACTURING INDUSTRY, INCLUDING RECLAIMED RUBBER*

Employes of 237 Plants Classified According to Draft Status after Proposed Deferments

Women	78,105
Over 38 and 4F	88,712
Age 31-37	21,937
Age 26-30	11,020
Under 26, available to Armed Forces..	6,251†
Under 26, (22-25 years) Essential. New deferments being requested	990‡
Total	207,015

Classified According to Type of Work before Proposed Deferments

Technical ¶	6,134
Operating ¶	148,717
Maintenance	14,404
Other	37,760
Total	207,015

¶ Technical Group by Draft Status

Women	1,203
Over 38 and 4F	2,061
31-37	1,145
26-30	974
Essential 22-25	492§
Available to Armed Forces, 18-25....	259
Total	6,134

* Data from more than 95% of industry.
† 3% of total employes.
‡ 0.5% of total employes.
§ Above data on numbers of technical men do not include those in operating work.

TABLE 2 FROM EXHIBIT B. SYNTHETIC RUBBER PRODUCTION AND RESEARCH*

Employes of 49 Plants Classified According to Draft Status after Proposed Deferments

Women	2,701
Over 38 and 4F	8,065
Age 31-37	3,784
Age 26-30	2,481
Under 26, available to Armed Forces ..	929†
Under 26, (22-25 years) Essential. New deferments being requested	680‡
Total	18,640

Classified According to Type of Work before Proposed Deferments

Technical ¶	1,964
Operating ¶	6,561
Maintenance	4,682
Other	5,433
Total	18,640

¶ Technical Group by Draft Status

Women	522
Over 38 and 4F	374
31-37	234
26-30	295
Essential 22-25	390§
Available to Armed Forces, 18-25.....	149
Total	1,964

* Including institutions conducting related research, but not including private plants of rubber goods manufacturing companies.
† 5% of total employes.
‡ 3.6% of total employes.
§ Above data on numbers of technical men do not include those in operating work.

The necessities for deferments in the synthetic rubber manufacturing plants, on the one hand, and those making rubber goods and reclaim rubber, on the other, stem in part from different situations.

The synthetic rubber-making program includes not only the manufacture of synthetic rubber, but also the making of butadiene, styrene, and other special raw materials and intermediate products from which synthetics are made. All of the operations in it involve new and highly technical research, piloting, and manufacturing problems. As one problem is completed, the demand for better quality and problems incident to safety and the ever-present war against corrosion and wear and tear bring new problems and demand experienced men who have lived with the problems of the past.

In many cases the special training required for technical men carrying out certain researches and piloting has only been taught for a few years. Much of the demand for men in the synthetic rubber program came after other war programs had assimilated many of the available technical personnel. Early in the war, many of those who could have been used joined the Armed Forces. Today there are no replacements, and if there were, it would be too late to give them the irreplaceable technical back-

[1] See INDIA RUBBER WORLD, Apr., 1944, pp. 64-68.
[2] All illustrations have been omitted in the interests of paper conservation, but the data contained therein have been incorporated in Tables 1 and 2. EDITOR.

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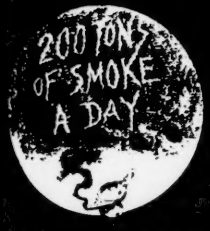

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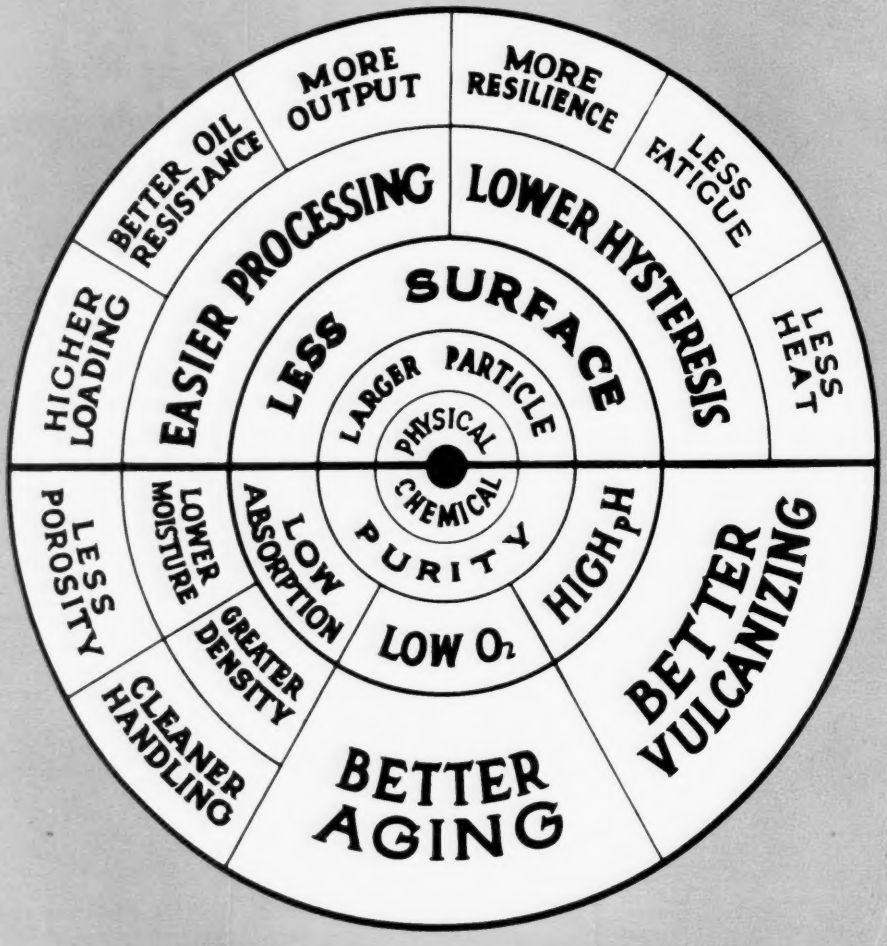

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ground which those now working in the program have obtained from their training in and contact with the problems on which they are working.

In the operating field it is often necessary to meet the rigors of long hours and night work on exposed towers and open structures and to meet the problems incident to mechanical failures, poisoning of catalysts, steam and water failures, and breakdowns due to corrosion, plugging, etc., of heat exchangers, pipe lines, valves, automatic instruments, distillation towers, and compressors. Relying on the then-existing regulations as to industrial deferments of key men and pre-Pearl Harbor fathers, the oil, chemical, and rubber plants making synthetic rubbers and their raw materials quite naturally picked for these jobs younger men in whom they had confidence. One cannot give to any new replacement the experience which has been had by a man who has lived through the early grief of starting an operation. Many of these men helped to pilot the operations or were in the plants while they were still under construction and saw every piece of machinery installed in an entirely new industry that was built in two years to a point that ordinarily would have taken from ten to fifteen years. In terms of years they are young employes. Relative to the age of the industry, they are oldsters. In older industries the situation is different, but in this there is no one else who has their knowledge. The essential man's ability in these fields is not measured fully by what he does each day, but rather by what he is capable of doing in an emergency.

In the rubber goods manufacturing industry where we are asking that only about 0.5% of the total employment be deferred, as against 3.6% of the total in synthetic rubber production and research, the conditions are different, but the 990 *vs.* 680 men to be deferred are quite as essential. Since Pearl Harbor the manufacture of non-essential rubber goods has been forbidden, stocks of essential rubber goods have been used up, and the manufacture of replacements has been held at dangerously low levels. Rubber and synthetic rubber can only be used for the making of products permitted by the industry regulatory order known as R-1. Military demands are larger than ever before. In many cases the manufacture of relatively small quantities of critical specialties determines the military's ability to use important production. For example, there is no use in making an airplane tire, or, for that matter, the airplane, if the pressure hose for the brake mechanism is not available.

After more than two years of scarcity, the industry is now called upon to expand and consume 50% more rubber and synthetics in 1944 than in 1943. At the same time that it is so expanding, it is having to learn to use new synthetics and make better products. The use of synthetics calls for the development, trial, and factory acceptance of new compounds and often calls for redesigning of the finished goods. A typical example of redesigning is the addition of two extra cap plies of cotton cord in the 7.50 x 20 mud-and-snow-tread design military tires made with cotton cord and the redesigning of many of the heavy-duty tires to use rayon cord with synthetics. Such work can only be done if trained technical men and the key factory men with experience—even if it has been acquired in a comparatively short period of time—are recognized as vital to the work of today. Many men in these industries have special skills and work as members of teams. The quality of rubber products on which the lives of our soldiers often depend must be improved, not jeopardized. In short, there are many reasons why key men must be kept in the technical forces and some of the manufacturing operations incident to making essential rubber goods. Not many are needed, but those who are needed must be retained.

Over and above all the foregoing is the basic fact that was emphasized in Progress Report No. 5, to wit, the rubber program calls for the completion of many more conversions from crude to synthetic rubber during the coming year and the first of next year. Even in the fourth quarter of this year we will use, with stocks, already dangerously low, more crude rubber than we will receive. Crude rubber is only being used in the most essential items, and the balancing of the books so that we can live within our income of new crude rubber demands the best efforts of men in various divisions of many companies. Engineers, chemists, and technical men must work in teams backed up by skilled operators. Every disruption of this teamwork jeopardizes the rubber program.

BRADLEY DEWEY
Rubber Director

April 3, 1944.

Action on Draft Deferments

War Manpower Commission, Washington, D. C., initiating a program to handle occupational deferment of men between 22 and 25 years, inclusive, on March 26 set up a committee so that quotas be established for specific activities vital to the war effort. Principal war agencies of the federal government represented on the committee are: Production Executive Committee of the WPB, Petroleum Administration for War, Solid Fuels Administration for War, ORD, ODT, WFA, War Shipping Administration, Maritime Commission, Federal Communications Commission, Fish and Wild Life, and Selective Service System. Representing the ORD are Bradley Dewey, Morehead Patterson, and Frank P. Downey.

The WPB on March 30 notified all regional directors regarding deferments in the 22-25 age group, stating that representatives from the War and Navy departments, Maritime Commission, and WPB are contacting manufacturers making war goods to ascertain if such representatives will support requests for such deferments. These representatives have been instructed to limit their endorsements in accordance with certain critical and urgent programs where such representatives are in current contact with the manufacturers. Among such programs are amphibious jeeps; tires and tubes (aircraft, combat, and heavy duty) including necessary tire cord, fabric, and molds, research and development work specifically assigned by the technical services; critical components for trucks.

Then on April 11th the Selective Service System issued a list of the activities in industry deemed important enough to justify exceptions to the general policy of drafting all qualified registrants under 26 years. Included were, for PAW, aviation gasoline program and synthetic rubber components and technical services vital thereto; for ORD, research, piloting, and production of synthetic rubbers, butadiene, and styrene; production of essential raw materials in three government-owned plants operated by Rubber Reserves Co. (at Memphis, Tenn., Naugatuck, Conn., and Philadelphia); manufacture of reclaimed rubber, of essential rubber goods permitted under R-1, and of rubber processing machinery.

Rubber Director Dewey has notified rubber goods manufacturing companies and those making synthetic and reclaimed rubbers as to the proper procedure to follow in recommending deferments for men under 26 years of age.

"It is probable that Selective Service will give no consideration of deferment to men of this age group without endorsement of the Rubber Director," Mr. Dewey said. "In order that any request for endorsement for deferment be valid, it will be necessary to prepare at least four copies of Selective Service Form 42-A Special. Three copies must be filed with the State Director of Selective Service who has jurisdiction over the location where the essential man is employed. One copy must be sent to the Office of the Rubber Director, New Municipal Center Building, Washington, D. C., for action by the Rubber Director. The form should be prepared with the greatest of care. The statement should not be generalized, and each case should be dealt with on the basis of the individual registrant. In addition to the above form, there must be submitted to the Office of the Rubber Director a special certification."

The Rubber Director stated that "an over-all manpower shortage in a critical area is no longer a valid reason for deferment. The nature of employment, special skill, experience, training, education, and the essentiality of the end-product all go to make up the present yardstick."

"Company action should be immediate," the Rubber Director said. "But the fact that a company has certified a man as irreplaceable does not mean that the registrant is excused from taking the pre-induction physical examination when ordered.

"The synthetic rubber and allied programs are vital to the war effort. Only by the closest cooperation by the industries involved, will it be possible to keep the Armed Forces supplied and our essential civilian transportation rolling."

CALENDAR

May 2.	Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.
May 5.	Akron Rubber Group. Spring Meeting. Mayflower Hotel, Akron, O.
May 19.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
May 20.	Chicago Drug & Chemical Ass'n. Annual Spring Party. Drake Hotel, Chicago, Ill.
May 25.	Northern California Rubber Group.
June 5-7.	Canadian Chemical Conference, Royal York Hotel, Toronto, Ont., Canada.
June 6.	Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif.
June 12-July 8.	Fifth War Loan Drive.
June 26-30.	A. S. T. M. Annual Meeting Waldorf-Astoria Hotel, New York, N. Y.
June 29.	Northern California Rubber Group.
Sept. 10-15.	A. C. S. Fall Meeting. Hotel Pennsylvania, New York, N. Y.
Sept. 13-15.	Division of Rubber Chemistry, A. C. S. Fall Meeting. Hotel Commodore, New York, N. Y.

UNITED STATES

Supply Situation on Alcohol, Carbon Black, Manpower Still Tight; Guayule Project May Be Saved

In addition to the continuing difficulty in providing enough rubber for all military and essential civilian demands, even though the present production of synthetic rubbers is at a rate of almost 700,000 long tons a year, related problems in maintaining and increasing the supply of such things as alcohol for synthetic rubber production, and carbon black for synthetic rubber compounding as well as retaining the minimum essential trained manpower for the operation of synthetic rubber producing and consuming plants were much in the forefront of the news during April.

Supplementary Progress Report 5A Issued

On April 3, Rubber Director Bradley Dewey issued Supplementary Progress Report No. 5A, entitled "Impact of New Draft Policies upon Rubber Program." This report gives an "up-to-the-minute exhaustive survey of the manpower used by the rubber program," and procedures were announced at the same time by use of which the Rubber Director stated he hoped that certain essential men having special qualifications would be kept where they would be of maximum value to the war effort. It was emphasized that "company action should be immediate" and that it was probable that Selective Service would give no consideration of deferment to men in the under-26-age-group without endorsement of the Rubber Director. Although it is probably too early to judge how much success will meet these efforts to retain enough of these young and essential men "to keep the Armed Forces supplied and our essential civilian transportation rolling," reports at this writing (April 25) indicate that different results may be obtained in different sections of the country, and 100% deferment of all the approximately 1,700 men requested by the Rubber Director is by no means assured.

Alcohol Supply Barely Adequate

In reports made last month by Walter G. Whitman, assistant director of the WPB Chemicals Division, the beverage distilling industry was given credit for producing enough alcohol to manufacture most of the synthetic rubber made to date and at the same time was requested to continue its full and cheerful cooperation with the war program to which it is making so vital a contribution. It was stated that alcohol production for March from all sources established a new record with 51,500,000 gallons produced and that the synthetic rubber program continued its strong demand, using 1,000,000 gallons every day. New requirements figures estimated the need of 630,500,000 gallons of 190 proof alcohol, which, it was stated, represented a decrease from earlier estimates by about 25,000,000 gallons for direct military, Lend-Lease, and indirect military and civilian uses, but that this decrease was largely offset by an 18,000,000-gallon increase in the estimate of the requirements for the synthetic rubber program. Serious alcohol problems are still ahead, and it appears at present that all producing facilities and the new plants now coming into operation must be run at full speed to meet the requirements, and some withdrawals from a stockpile of less than two months supply will be necessary, it was further revealed. The possibility of partial resumption of beverage alcohol production was discussed by the WPB's Industrial Alcohol Producers' Industry Advisory Committee, but no decision was reached.

At about the same time during April, the Requirements Committee of the WPB decided against approving the construction of additional new facilities for the production of alcohol from wood wastes at Springfield, Oregon and from inedible sweet potatoes at Clewiston, Fla., although previous information indicated that these projects would be carried through to completion since they had preliminary approval by the Chemicals Division and Chairman Donald Nelson. The Senate Committee on Agriculture is reported to be planning to investigate more fully the reasons for the abandonment of these projects.

U. S. Guayule Rubber Program Developments

Following the recommendation on March 21 by the House Committee on Appropriations that the U. S. Emergency Project for guayule rubber be liquidated during the next fiscal year, a subcommittee from the House Committee on Agriculture visited the government's guayule properties in California early in April to collect more data to determine if the Appropriations Committee action was justifiable. Upon their return to Washington, the chairman of this subcommittee, Representative W. R. Poage, of Texas, joined with Rubber Director Dewey and Gordon R. Salmond, of the Department of Agriculture Forest Service, in arguing against premature liquidation of the guayule program, before the Senate Agricultural Appropriations Subcommittee. As a result prospects for continuing the program looked considerably brighter. Senate Subcommittee Chairman Russell, of Georgia, made no secret of the fact that he was personally greatly impressed by the arguments advanced by the three witnesses.

Congressman Poage requested the Senators to amend the agricultural appropriations bill as passed by the House. He asked that at least $5,000,000 be given the Forest Service to continue its experimental work. The Budget Bureau recommendation for the guayule project had been for $7,000,000, but the House had cut it to $3,000,000 and had directed that the money be used as a liquidation fund. "Guayule can be extremely valuable as a substitute for imported natural rubbers," Mr. Poage pointed out.

He added that the General Tire & Rubber Co. apparently recognizes this fact and is now operating its own plant in Coahila, Mexico. He predicted that it will be several years after we reconquer the East Indies and the Malay states before we can expect appreciable shipments of *Hevea* rubber from that area.

Everett Dirksen, a powerful member of the House Committee which voted for liquidation of the project, has already admitted that he fears he may have voted wrong when he agreed to the liquidation. At least one other member of the House Committee is also reported to have had a change of heart.

If the Senate votes to restore funds for carrying on the project, there is little reason to believe that the House conferees will argue the point. It is reported in fact that the original proponents of the project, including Mr. Poage and John Z. Anderson, of California, have never been able to figure out just why the House Committee voted as it did when it decided to recommend liquidation, unless it was in a misguided spirit of economy.

For More Carbon Black

To increase greatly the production of carbon black, plans are being considered to construct a 60-mile pipe line to carry natural gas to existing channel carbon black plants now operating below capacity in the Panhandle area of Texas, the WPB Chemicals Bureau reported April 12. It is estimated that an additional 30,000,000 pounds a year of the easily processed channel black can be obtained from present facilities if sufficient gas is available to enable the plants to run at capacity, WPB officials said. The proposed pipe line would furnish at least 60,000,000 cubic feet of gas a day, enough to produce the 30,000,000 pounds, they explained. WPB has been told that an additional 100,000,000 feet of gas a day is available in the West Texas area. The increased production that would result from the pipe line would be sufficient to meet the 1944 requirements of the rubber program, WPB officials said. They estimated that for the first quarter of 1945 it will be imperative to produce at least 100,000,000 pounds of additional channel carbon black, which will require expansion of existing plants or the construction of new ones.

Members of WPB's Carbon Black Manufacturers Industry Advisory Committee have been requested to report the extent to which expansion of facilities can be undertaken by their companies. Some have indicated willingness to relocate plants or to build new ones in areas where gas is available. Two manufacturers have informed the Chemicals Division that application for new facilities would be contingent on a government subsidy to take care of any differential between the price currently paid and the price of the new gas supply.

At the April rate, the annual output should reach 372,600,000 pounds, WPB officials declared. Expected production from approved projects now under construction will total 42,000,000 pounds, and projects recommended for approval will furnish an additional 65,000,000 pounds. The total anticipated new production (covering all types of furnace carbon black) equals 107,000,000 pounds. The annual production rate is expected to reach 479,000,000 pounds before the end of December, provided all new plants are in operation, WPB stated.

The desirability of placing channel carbon black under allocation was discussed, but members of the committee expressed the view that the move was not necessary at this time.

U. R. W. A. Doings in Akron

The week of April 17 was one of important events on the Akron labor front, especially to members of the United Rubber Workers of America and to the union itself, as recorded by the *Akron Beacon Journal*. A brief review of the happenings during this week, as presented by the paper's labor editor, Harold Lengs, is of considerable interest and is given herewith:

"Tuesday: Workers at Goodyear Tire

& Rubber Co. defy U. R. W. A. president Sherman Dalrymple and continue strike over transfer of Negro workers into departments where they had not been previously employed.

"Wednesday: Two departments return to work at Goodyear. Membership of Firestone local repudiates stand taken by its executive board in supporting Goodrich local in its expulsion of Dalrymple from membership in the local.

"Thursday: Goodrich local bows to authority of international executive board to interpret U. R. W. A. constitution between conventions and returns Dalrymple's name to the membership rolls, but will carry fight to convention. Workers heed union leaders, strike over Negro question at Goodyear is ended, and production returns to normal. Firestone local executive board challenges motion passed at membership meeting, claims it has a petition signed by thousands of members supporting its stand on the Dalrymple situation. Controversy in Plant 1 mill room at Goodyear causes shutdown on afternoon shift, threatening all production.

"Friday: Dalrymple blames production loss in Goodyear millroom on lockout by the company. Work stoppage continues on second shift."

Additional commentary from this same source of further interest in the labor situation is that the millroom strike at the Goodyear plant was blamed by union leaders on the unrest gradually spreading because of attempts by some factories to lower piecework rates. The specific charge is not made in the Goodyear case as there was no attempt to change piece-work rates or start new time studies on jobs. It is reported that there is considerable worry on the part of union leaders on this question and that they are afraid that a new wave of strikes may be in the making. The international executive board of the U. R. W. A. in recognition of the seriousness of the situation last week publicly denounced the practice.

As the requirements for rubber products at any cost because of a national emergency are gradually reduced and management must examine operating costs in greater detail because of a diminishing margin of profit and take steps to maintain this profit at an adequate level, labor-management problems may necessitate considerable effort on the part of arbitration bodies to prevent work stoppages. Labor, earning more than ever before, will be reluctant to any reduction in income because of higher living costs, and compromise solutions which must be arrived at will not be easy.

New Butadiene Rubber Announced

A new synthetic rubber with claimed suitability for truck and bus tires is in process of development by the research department of the Mathieson Alkali Works, Inc., 60 E. 42nd St., New York, N. Y., G. W. Dolan, president of the company, revealed April 25. The new rubber, composed of butadiene and a chemical produced from readily available raw materials, is reported to have greater resistance to heat, moisture, oil, and abrasion than GR-S. Its permeability to gases is less. Some laboratory tests are said to have indicated superiority to natural rubber as well. Milling properties, Mr. Dolan stated, are good.

Company officials said that the Office of the Rubber Director may put the rubber into production in a short time. The production cost is expected to be not more than that of GR-S. If use of a government-owned plant is denied, the company plans to build a plant to supply anticipated post-war markets.

Army Lists Rubber Uses

The U. S. Army requirements of crude or synthetic rubber for combat materiel were reported April 20 by the War Department to the Office of War Information as follows:

	Pounds
Medium tank	810
Fighter plane	105
75 mm gun carriage	404
37 mm gun carriage or jeep	70
Field ambulance or ¾-ton scout car	200
Truck (2½ tons 6 x 6)	270
Motorcycle	14
Gas mask	1½
One mile of field wire	19

Reclaimed rubber is also being put to use by the Army in guns, planes, and tanks in the following amounts:

	Pounds
Medium tank	30.9
Half-track	161.8
Jeep	41.8
75 mm gun carriage	10.3
37 mm gun carriage	18½
One engine pursuit ship	82.7
¾-ton scout car	51.72
¾-ton truck or weapon carrier	45-62

The Army uses 3,000,000 pounds of synthetic wire cable jackets monthly.

A standard civilian tire, 6.00 by 16, uses 10.2 pounds of Buna S rubber and 1.7 pounds of reclaim rubber, the Office of Rubber Director reported.

The Army Depot, Philadelphia, Pa., recently placed contract awards for 934,000 synthetic-resin coated raincoats, including: 7,000 from Richard, Boggs & King, Chicago, Ill.; 15,000, Warren Featherbone Co., Three Oaks, Mich.; 130,000, B. F. Goodrich Co., Watertown, Mass.; 100,000, A. B. Zuckert Co., Milwaukee, Wis.; 184,000, United States Rubber Co., Mishawaka, Ind.; 50,000 Archer Rubber Co., Milford, Mass.; 130,000, Oak Rubber Co., Ravenna, O. Orders for 134,000 rubber-coated raincoats went to: Archer, 50,000; U. S. Rubber, 54,000; Zuckert, 30,000. Panther-Panco Rubber Co., Inc., Chelsea, Mass., received orders for 25,000 raincoats, and Tyer Rubber Co., Andover, Mass., 80,000.

The Boston, Mass., Quartermaster Depot recently awarded contracts for 2,000 pairs of women's low overshoes to Goodyear Footwear Corp., Providence, R. I., and 1,612 pairs of orthopedic rubber heels to the Providence plant of United States Rubber Co.

Navy Rubber Conversion Grows

Seventy-five per cent. of the Navy's crude rubber requirements have been replaced by substitutes. This accomplishment, carried out in cooperation with the WPB and other agencies, parallels the Navy's intensive program of rubber conservation and salvage. More than 2,000 tons of usable rubber have been reclaimed from 13 war theaters by material redistribution units and uncountable thousands of miles have been added to the life of tires through district tire warehouse pools. The Navy's conversion from crude to synthetic rubber requirements is estimated to be 10% greater than that achieved by industry in general. Acting under the direction of the Office of the Navy Rubber Director, this switch-over to synthetics has been effected notably in the following categories:

(1) Tires: smaller sizes, 100% conversion except for seaming; intermediate sizes, approximately 70% synthetic; larger sizes, still made entirely with crude, partly because of a shortage of high-tenacity rayon cord which helps reduce extra heat generated by synthetic materials. (2) Mechanical goods: hose, packing and gasketing rubber requirements now are about 90% synthetic; conversion of submarine battery jars and aircraft magnetoes was expected by April 1. (3) Footwear: almost all types converted to synthetics except for a small percentage of crude used in cement form for adhesion. (4) Wire and cable: more than 95% conversion based on prewar specifications. (5) Protective clothing: no crude rubber now used by the Navy, a saving of about 20 tons each month. (6) Medical and surgical goods: hot water bottles, ice caps, rubber tubing, and most other articles now made completely with synthetics. (7) Flotation equipment: estimates are that the only remaining exceptions to conversion in this category, the aircraft life raft and the Mae West life vest, will be made entirely with rubber substitutes by April 1. (8) Gas masks: 100% conversion effected January 1, 1944. (9) Bullet-proof gasoline tanks: now only 40% crude rubber.

The record was revealed in the semi-annual progress report of Arthur M. Hill, Navy Rubber Director.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., held its annual directors' meeting April 17 at which all officers were reelected as follows: chairman of the board, Lammot du Pont; president, W. S. Carpenter, Jr.; vice presidents, J. Thompson Brown, R. R. M. Carpenter, J. E. Crane, A. Felix and Henry B. du Pont, A. B. Echols, J. B. Eliason, W. F. Harrington, H. G. Haskell, J. W. McCoy, F. W. Pickard, J. J. Raskob and C. M. A. Stine; treasurer, J. B. Eliason; secretary, W. F. Raskob. The following appointments also were made: assistant treasurers, W. J. Beadle, J. A. Horty, A. B. King, and H. B. Robertson; assistant secretaries, M. D. Fisher, F. G. Hess, and E. A. Howard.

E. I. du Pont has named its Dye Works at Deepwater Point, N. J., the "Chambers Works" in honor of Arthur D. Chambers upon his retirement after 47 years with the company. He was also presented with a watch by the Wilmington staff of the organic chemicals department at a dinner feting him upon his retirement. An outstanding American industrial organic chemist and a pioneer in creating an American synthetic organic chemicals industry and in freeing this country from dependence upon Europe for dyestuffs after the last war, Dr. Chambers' recommendations led to the establishment 26 years ago of the plant now named for him. The operations in the company's plants for making dyestuffs and intermediates, neoprene, tetraethyl lead, and many other synthetic organic chemicals were under his direction.

The appointment of Harold Brayman as director of the public relations department to succeed the late Theodore G. Joslin, was announced last month by du Pont. Assistant director of the department since 1942, Mr. Brayman was a Washington correspondent and columnist before joining the company. He entered newspaper work after graduation from Cornell University in 1920.

Treasury Decision 51029, Bureau of Customs, Washington, D. C., decrees that, besides all other information required by law or regulations, customs invoices for boots, shoes, or other footwear, including athletic or sporting boots and shoes, made wholly or partly of leather, contain a statement whether or not the articles were sewed or stitched by the McKay process.

Tire Price and Rationing Program Revised by OPA

A revision of MPR 119—Original Equipment Tires and Tubes—which, effective April 18, became RMPR 119, for the first time establishes ceilings for synthetic rubber tires and tubes for sales to vehicle manufacturers for placing on equipment made by them. The new ceilings are an average of 22% above those for natural rubber tires and tubes, but an average of 11% lower than prices previously charged for some time for synthetic tires and tubes. For almost every size and type sold, ceilings are listed for the tires, tubes, and flaps. A typical ceiling is that for the chief military-size tire 7.50-20, 8-ply (2-cap construction), $26.33 for the tire, $3.19 for the tube, and 45¢ for the flap.

Sales of synthetic rubber tires and tubes to vehicle manufacturers for use on equipment for war orders have been exempt from price control since April 1, 1943. The higher prices in effect during the period without price control were based for the most part on experimental production. It was because of this experimental stage that the price control exemptions were granted.

The new ceilings were determined after many meetings with the Rubber Tire Manufacturers' Industry Advisory Committee and with individual members of the industry. The ceilings will give the industry generally dollar-and-cent unit margins over costs which compare favorably with the margins generally obtained on this class of business during 1941. A provision is made that an individual manufacturer may apply for adjustment in ceilings shown to impede or threaten his production. In the case of the minor percentage of synthetic tires and tubes sold to equipment manufacturers for use on vehicles designed for civilian use, the ceilings heretofore applicable were those provided for natural rubber tires and tubes. Hence the new ceilings for this limited volume of business will be an average of 22% higher than formerly.

A differential for tires of rayon construction will be permitted upon application to, and approval by, OPA. This differential will be allowed to the extent that factory costs of rayon construction tires exceed those for cotton construction tires.

At the same time OPA replaced "freeze" ceilings for natural rubber tires and tubes sold to equipment manufacturers with dollar-and-cent ceilings, which reflect the general level of the "freeze" maximums formerly observed. There are only a few minor changes in individual ceilings which occur when "freeze" prices are replaced by uniform dollar-and-cent ceilings. All sizes and types of these natural rubber tires and tubes are also given individual ceilings. A typical ceiling is that for the chief military-size tire, 7.50-20, 8-ply (2-cap construction), $21.37 for the tire, $3.03 for the tube, and 45¢ for the flap.

Separate ceilings are provided for the larger volume accounts known in the industry as "Special List Accounts" and "Detroit Accounts." These separate ceilings must be reported to, and be approved by, OPA. They will be lower than the ceilings announced April 18 which are applicable for general use. This is in accordance with general industry practice.

New ceiling prices at retail and wholesale for new synthetic rubber tires and tubes went into effect May 1 in an action which separated for the first time ceilings for synthetic tires and tubes from those for natural rubber tires and tubes. Maximum retail prices for all types of tires and tubes, and for all recapping and repairing services are now contained in one simplified regulation, MPR528—Tires and Tubes, Recapping and Repairing—RPS 63—which supersedes Retail Prices for New Rubber Tires and Tubes; RPS 66—Retreaded and Recapped Tires and the Retreading and Recapping of Rubber Tires; and MPR 107—Used Tires and Tubes. Tire and tube repairs were simultaneously removed from the services regulation, MPR 165. Most of these new ceilings are dollar-and-cents prices, and members of the industry who have reviewed them agree that tire dealers, recappers, and repairers should find it much easier to operate under this new regulation which has been designed for practical, every-day use. At the same time the wholesale ceiling price structure for the rubber tire and tube industry—MPR 143—Wholesale Prices for New Rubber Tires and Tubes—was simplified to bring it into line with the new conditions of synthetic production.

These actions give a complete pricing pattern for the industry on synthetic tires and tubes, not only for passenger cars, but also for trucks, buses, trailers, off-the-road equipment, industrial equipment, farm implements, tractors, and motorcycles. In addition, the new regulation includes ceiling prices for natural rubber tires and tubes, used tires and tubes, recapping and recapped tires, and tire and tube repairing.

At the retail level passenger-car new synthetic rubber tire ceilings will be approximately 9% above November, 1941, list prices on natural rubber tires of the grade sold as original equipment for new cars, commonly known as manufacturers' 100 level brands. However the new ceilings are about 6% below the temporary ceilings used since synthetic tire production began. In general, tubes and truck tires are continued at existing retail ceilings. On both passenger and truck tires and tubes the action provides dealers with dollar-and-cent margins at least as great as they have received in the past.

For the few natural rubber passenger-car tires and tubes still being sold, present ceilings are continued by freezing the February 1, 1944, levels. Although natural rubber passenger-car tires and tubes have not been produced for civilian use since December, 1941, a limited number are still on the market.

Conversion of the industry from the use of natural to synthetic rubber has necessitated the leveling of ceilings for principal types of tires and tubes. Tire manufacturers are permitted by the WPB to make only one grade of tire in any size, ply, and type. When natural rubber tires could be produced, manufacturers had several price levels on various brands. For all popular types of tires and tubes there will now be only one ceiling price for each size regardless of brand.

In general the new regulation decreases the present temporary ceilings for manufacturers' brands and increases ceilings for private brands of passenger car tires. The most popular size passenger car tire, 6.00-16, will have a new ceiling price of $16.05, regardless of brand. Previous temporary ceilings on the same tire were $17.11 for manufacturers' brands and $15.37 for private brands. As manufacturers' brands make up the larger part of production, the net effect is a decrease in prices to the public for these tires.

Other principal changes in ceilings are:

1. Manufacturers' and distributers' maximum prices at wholesale on synthetic passenger-car tires have been reduced under the temporary ceiling by an amount equal to the decrease in retail ceilings for each size of tire.

2. Manufacturers' and distributers' ceilings at wholesale on synthetic and natural rubber truck, bus, and industrial tires are increased 6½% of the retail list prices which they ordinarily use with discounts to determine their prices to dealers.

Retail ceilings on these tire are not increased. Dealers' margins will not be squeezed, however, for at retail these tires have generally sold at discounts of more than 6½% from list.

3. The general level of retail ceilings for used tires and tubes is unchanged. Dollar-and-cent ceilings are continued for all sizes and types originally listed except that the highest priced grade of tire is discontinued because of the disappearance of these used tires from the market. An important change made is in the method of determining the grade of tire for pricing purposes. It will no longer be necessary to measure remaining tread design depth to establish the proper price. All that will be necessary is to determine whether a tire has "continuous" tread design, is "smooth", or is "worn into body plies."

4. Retail and wholesale ceilings on recapping and recapped tires in general are continued in effect at unchanged levels. Farm tractor recapping prices are increased 12½% to bring them in line with other recapping prices, and ceilings have been added for rise and cane special-type tractor tires.

5. Dollar-and-cent retail ceilings on tire and tube repairing replace former ceilings frozen at March, 1942 levels, which are generally maintained. Wholesale pricing provisions, consistent with those for recapping, are included for tire and tube repairing.

Order 2 (April 7), RMPR 131—Camelback, and Tire and Tube Repair Materials—establishes ceilings for sales by jobbers of "Mile-Saver" tire patches distributed by the Miller Rubber Co., Akron, O.

Amendment 16, MPR 395, effective March 28, establishes ceilings for new rubber tires and tubes and recapped tires, excluding bicycle tires and tubes, sold or delivered in the Virgin Islands.

Compulsory periodic inspections of tires on passenger automobiles was discontinued April 20, but motorists must still have inspected any tires they wish to replace. The truck tire inspection program, however, continues as before. In announcing the change OPA Administrator Chester Bowles said:

"This does not mean that the tire picture has become any brighter. It simply means that the inspection program has fulfilled its primary objective—to make motorists conscious of the extreme need for tire conservation and care.

"A shortage of civilian passenger tires still exists, and production this year will run below civilian needs. According to the latest estimates of the Office of the Rubber Director, 22,000,000 tires will be produced for civilians this year, compared with more than 34,000,000 new replacement tires produced in 1941. The situation is made even more serious by the disappearance of used tires from the markets in many areas. . . .

"The tires on cars now in operation have already been examined at least three times since the inspection program was put into effect on December 1, 1942. As a result, all of the required repairs, mechanical difficulties and recapping needs which were uncovered by the inspections have been called to motorists' attention and taken care of."

It is important that motorists retain their tire inspection records because OPA

will continue the use of these records in the gasoline rationing program.

OPA pointed out that it will still be possible, without the periodic inspections, to assure the replacement only of those tires not capable of giving further service and to maintain control of motorists' tires through the serial numbers. This will be possible because inspection by an OPA authorized tire inspector will continue to be required before a ration certificate to replace a tire is issued by a local War Price and Rationing Board.

The following amendments have been added to RO 1A—Tires, Tubes, Recapping and Camelback. No. 72, effective March 31, relieves tire dealers of filing quarterly reports of their stocks of tires and tubes; only those dealers provided with an inventory reporting form by OPA need continue filing the quarterly report. The amendment also removes all restrictions on the number of tires and tubes allowed to be acquired by dealers as long as the replacement portion of a consumer's tire ration certificate is given up for each tire bought.

No. 73, effective April 21, provides that small essential delivery trucks previously eligible only for used tires will now be able to obtain certain sizes of new ones as well, and all small trucks and other commercial vehicles are now eligible for used tires. Other changes incorporated in Amendment 73 make eligible for Grade I passenger tires persons obtaining gasoline through the use of an Acknowledgment of Delivery—used largely by military personnel—for a purpose for which preferred mileage could be issued, indicates that a ration certificate for a new passenger tire may now be used to buy only the tire size specified on the certificate; and permits issuance of a Grade III certificate for use on farm tractors or other farm implements, in addition to certificates for tractor or implement-type tires.

The next amendment provides that motorists heretofore eligible only for used passenger tires may now secure new passenger tire "factory seconds" following their reclassification into Grade III, effective April 17. At the same time a new passenger tube "factory second" may be acquired without a certificate as they are being taken out of rationing. "Factory seconds" have a price ceiling 25% less than that for perfect new passenger tires. Until the change factory seconds were included with all other new passenger tires and tubes, but were removed from that category because of slow movement as eligible motorists were unwilling to accept a factory second, wanting the best tire possible, which resulted in a "backing up" of the "seconds." As of April 1, about 50,000 new passenger "factory seconds" of synthetic rubber were in manufacturers' hands. It is expected that these tires will be moved out more easily in the Grade III category because (1) they are on a par with, or of better quality than, most used tires, and (2) there is now a shortage of used tires in most sections of the nation. Motorists issued gasoline rations for non-preferred occupational driving are eligible for used passenger tires; now, in addition, they may buy new "factory seconds."

Also, the provisions in the tire rationing regulations, in effect since February 16, authorizing increased inventories of new tires and tubes exclusively to wholesale tire dealers are to be revoked so that when the tire situation improves to a point where the working inventories of other levels of the trade can be increased, OPA will be able to increase all levels—whoesalers, combination wholesalers and retailers and exclusive retailers—at the same time and on an equitable basis. Under the provisions of the regulations revoked, comparatively few tire dealers were eligible for increased allotments because only a small number qualified as exclusive wholesalers—the only group eligible. They were allowed a maximum allotment of 200 tires and tubes for each establishment and an additional new tire and tube for each $500 of net sales in 1941 to dealers.

Amendment 75 warns that motorists must keep their tire inspection records even though the requirement for periodic tire inspections was lifted April 20. The Tire Inspection Form, which contains a record of all gasoline rations issued to an automobile as well as a record of tire inspections, must still be presented to the ration board whenever application is made for a gasoline or tire ration. It must be kept with the automobile when it is being operated, and must be transferred with it if it is sold. Further rules in connection with Tire Inspection Certificates also are covered in Amendment 119 to Ration Order 5C, the gasoline rationing regulation.

Amendment 6 to RO 1B—Mileage Rationing: Tire Regulations for Puerto Rico—effective April 10, covers additions to tire eligibility list, transfers of tires on vehicles, and new dates for inspections of S-1 and S-2 coupon books.

As a result of increased synthetic rubber production, the number of tires to be rationed to small trucks and farm tractors and implements in April compared with March was raised, but April tire tnd tube quotas were substantially lower than those of April, 1943, a more comparable month because of similar seasonal influences. The total truck tire quota was about 45,500 tires less than the number made available in April, 1943.

While April's quota of farm tractor and implement tires was increased by about 10,000 from the March figure, it is still far below the demand for these tires and 45% less than the total number of farm tractor and implement tires allocated 12 months ago. The new passenger tube quota was 691,325 a 7.2% increase in April over March, but almost 45,000 less than a year ago. A comparison of March and April quotas follows:

April	Passenger and Motorcycle	March
691,525	Grade I (New Tires)	691,025
645,050	Grade III (Used and Reclaimed)	645,050
691,325	New Tubes	644,950
	Truck and Bus	
207,345	New Tires—7.50 or smaller	171,487
115,213	New Tires—8.25 or larger	114,311
230,407	New Tubes	230,503
	Farm Tractor and Implement	
13,800	Rear Tractor Tires	8,280
18,400	Front Tractor and Implement Tires	13,800
23,000	Tubes	18,400

Other OPA News

Manufacturers and wholesalers of rubber heels sold in the home replacement trade were authorized by Order No. 11 under MPR 477—Sales of Rubber Heels and Sales in the Shoe Factory and Home Replacement Trades—effective April 3, to sell and make deliveries of these heels subject to a later change in price ceilings by OPA. This adjustable pricing provision was granted temporarily pending the establishment of dollar-and-cent ceilings for higher quality rubber heels sold in this trade, which supplies heels, through retailers, to consumers who desire to attach them to shoes in their own homes. This adjustable provision does not apply at the retail level. Until the new ceiling prices are announced, manufacturers and wholesalers may not receive payment in excess of the maximum prices now in effect, which are for heels of all qualities, OPA pointed out.

Under Amendment 9 to Ration Order 6A—Men's Rubber Boots and Rubber Work Shoes—effective April 15, manufacturers of rationed rubber footwear may apply for permission to sell some factory damaged stocks, discontinued styles, and government order rejects without collecting ration currency. The release from rationing applies only to manufacturers' stock and covers only those factory damaged stocks known in the trade as culls, discontinued styles in stock since April 1, 1942, and specially designed government order rubber footwear that has been rejected and is not salable for ration currency because of its special style or unusual size. Application for "non-rationed" stickers is to be made to the OPA national office in Washington, and manufacturers are being individually notified of the information to be sent with their applications. OPA explained that this action will bring needed relief to manufacturers and will put on the market, non-rationed, a small quantity of rubber footwear that otherwise would deteriorate because it is not salable for ration certificates.

Willard J. Scott, formerly head of the OPA Rubber Footwear Branch's Operations Section, has been made acting chief of the branch, succeeding W. A. Molster, now assistant director of the Miscellaneous Products Rationing Division. Dewitt Gutman has been assigned to Mr. Scott's former post. The latter spent 17 years with the Hood Rubber Co., Watertown, Mass.

Effective April 15, sellers and buyers of reclaimed or scrap rubber no longer need keep records showing the quantity of each grade and quality on hand and on order as of the close of each calendar month. Amendment 4 RPS 56—Reclaimed Rubber—and Amendment 10 to RPS 87—Scrap Rubber. The sellers of reclaimed rubber affected are mainly manufacturers; while the purchasers are generally wholesalers and industrial consumers. Scrap rubber sales are generally made to industrial consumers by dealers, collectors, and others. OPA said that as this requirement is no longer necessary, it has been eliminated in accordance with the agency's policy of holding record-keeping and reporting requirements to the minimum. Records must still be kept, however, of purchases and sales, with the name and address of the buyer and seller, and the price.

Amendment 8, RPS 82—Wire, Cable and Cable Accessories—effective April 3, sets ceilings for armored cable.

MPR 523, effective March 27, sets maximum prices for plastics products.

Jesse Jones, Secretary of Commerce, Washington, D. C., on April 4 announced that Defense Plant Corp., RFC subsidiary, has authorized execution of a contract with Goodyear Decatur Mills, Decatur, Ala., to provide plant facilities at Decatur at a cost of approximately $1,250,000 and of a contract with United States Rubber Co., New York, N. Y., to provide plant facilities at Scottsville, Va., at a cost of approximately $2,240,000. The respective companies will operate these facilities, but title remains in Defense Plant Corp.

Then on April 18 Mr. Jones revealed that DPC has authorized execution of a contract with The O'Sullivan Rubber Co., Inc., Winchester, Va., to provide equipment at a plant in Winchester at a cost of approximately $250,000. The O'Sullivan company will operate these facilities; title remains in Defense Plant Corp.

Changes in WPB Orders

Standard sizes of civilian highway truck tires will contain a much smaller proportion of crude rubber and a much larger amount of synthetic rubber after April 1, according to a directive issued March 28 by the Rubber Director to the tire manufacturing industry. The reduction in crude content amounts to approximately 35% and will have the effect of lessening a major drain on the nation's scanty stocks of crude rubber. Reduction in the quantity of crude rubber needed for the highway truck tires has been made possible by the increasing supply of high-tenacity rayon tire cord. Use of rayon cord in truck and bus tires makes possible avoiding the destructive heat build-up which normally characterizes such heavy tires when they contain large proportions of synthetic. Two of the major types of truck tires affected are the 8.25-20, 10-ply and the 11-22, 12-ply standard highway tires. Similar conversions are being made in the manufacture of sizes intermediate between these two. Under the terms of the directive size 8.25-20 may not contain more than 24 pounds of crude rubber; while size 11-22 may not contain more than 41.85 pounds. The directive permits the truck tires to be made in two ways, either with 100% synthetic tread applied to a 100% crude carcass, or with the permitted amount of crude distributed anywhere in the tire. The new directive was originally in the form of a letter to the industry. It will be formally incorporated in R-1 shortly.

R-1, Appendix III as Amended April 5, 1944, incorporates five changes, as follows:

1. Use of crude rubber and natural latex in compression-type mountings and insulations is banned. Previously these materials were allowed for compression-type mountings or insulations where the Shore durometer hardness was 40 or over.

2. No crude rubber of latex may be used in non-bonded torsional vibration dampers, but bonded dampers of this type may be made from crude until further notice. Formerly all torsional vibration dampers could be made from crude rubber.

3. Special authorization by WPB is required for use of crude rubber or natural latex in manufacture of cushioning for cameras, radio, and radar instruments, or fire and flight control mechanisms. No mention of these particular items had previously been made.

4. In making milking machine inflations during April, crude rubber or natural latex could be used up to an amount not exceeding one-third of the manufacturer's consumption of the materials for milking machine inflations during the first calendar quarter of 1944. In March manufacturers were only permitted to use the materials in half their inflations. The new revision bans use of crude rubber or natural latex in the inflations after April 30, except on WPB authorization where the manufacturer has not used up his quota of material for April as provided in the new amendment.

5. Grade "A" camelback may be used in tires for fire, police, or ambulance service. This camelback must have a minimum of 65% general-purpose synthetics in compound by volume and must have a minimum total RHC plus general-purpose synthetics of 70.

The unrestricted manufacture and distribution of synthetic rubber thread have been extended from April 1 to October 1, 1944, by Conservation Order M-124, as Amended March 27—Rubber Yarn and Elastic Thread. At a recent meeting of rubber thread manufacturers with the WPB's Office of Civilian Requirements representatives, agreement was reached that this extension of time is necessary in order to develop commercially satisfactory synthetic rubber thread from Buna S, which is still in the experimental stage. WPB pointed out, however, in announcing the time extension, that the quantity of rubber thread made available for civilian use would be very limited for at least several months as the synthetic rubber thread made from neoprene is going almost exclusively to the military. A recent survey made by the OCR showed that the most urgent civilian needs for rubber thread are repair braids and webbings, elastic for infants', misses' and children's underwear, hose supporters, foundation garments, suspenders and garters. OCR is desirous of directing the distribution of synthetic rubber thread so as to meet some of these needs. WPB officials said that distribution will be carefully scrutinized to determine that sufficient quantities of rubber thread reach these channels and that an ample flow of materials is available. Hope was expressed that it will not be necessary to issue directions governing the distribution of synthetic rubber thread or to assign ratings which would give preferential delivery for these products. WPB said that such measures of direction will be taken if it becomes necessary.

Bradley Dewey, Rubber Director, announced April 8 that, as of May 1, 1944, Grades A and C synthetic rubber camelback may be used for retreading with no restrictions. These grades are superior to Grade F, the only type available for passenger-car tires during the previous three months. Grade A is top-quality camelback; only Buna S synthetic is used in it. Grade C is medium-quality camelback; of the rubber used, 25% may be reclaim. Grade F contains no crude or synthetic rubber. A gradual increase of production of Buna S has made it possible to make available to passenger-car owners the better-wearing grades of camelback.

The percentage of metals a manufacturer may use for tire chains for passenger cars for one year beginning April 1 was raised from 16 to 24% of the total weight of metals he used in the production of all tire chains he sold during the base period April 1, 1941, to March 31, 1942, according to Limitation Order L-201, as Amended April 3, 1944—Automotive Tire Chains, Tractor Tire Chains and Chain Parts. Also, a producer may use in the year beginning April 1, 1944, the amount of metal for farm tractor tire chain he sold either during the year April 1, 1940-March 31, 1941, or the year April 1, 1941-March 31, 1942, whichever is greater. The order previously authorized production on the basis of a two-year period, April 1, 1940-March 31, 1942. The 6.00-16 tire size has been added to the sizes permitted for commercial vehicles. Nevertheless the plants in I and II Labor Shortage Areas may not use a greater tonnage for tire chain production under L-201 than they used last year unless a specific authorization is obtained from WPB, whose policy is now to authorize increased production in such a manner as to avoid increasing requirements for labor in labor shortage areas. Plants in these areas must file a request with WPB if they desire to increase their tire chain output. They must indicate whether or not additional manpower will be required and give any other relevant information.

By amending General Allocation Order M-300 last month WPB placed under allocation for the first time dipentene and pine tar.

Restrictions on the use of coarse grit aluminum oxide abrasive grain in bonded and coated abrasive products and limitations on the types of rubber-bonded abrasive products which may be manufactured were eliminated by revocation of Conservation Order M-319-a, April 11. The supply of coarse grit aluminum oxide grain is now relatively plentiful, and the abrasive industry has been fully converted to the use of synthetic rubber; so restrictions of the order are no longer believed necessary. Order M-319-a also contained a 60-day limitation on inventories of bonded and coated abrasive products. While this limitation has also been revoked, WPB Tools Division representatives call attention to the fact that inventories of these products are still subject to Priorities Regulation 1 and that deliveries in excess of a practicable minimum working inventory are not permitted. The term "practicable minimum working inventory" should be strictly construed, the Tools Division said.

Because of easier supply conditions Allocation Order M-307 was amended April 11 to provide an increase from 1,000 to 2,000 pounds per month in the small-order exemption for casein, used in paper coatings, glues, synthetic rubber, and paint, as well as for a number of other purposes.

Order M-365, effective April 1, places pine oil under allocations.

Allocation Order M-25—Formaldehyde, Hexamethylenetetramine, and Pentacrythritol—was revoked April 6 and the products involved transferred to General Allocation Order M-300.

Because of the mounting demands of the rubber program, ultra-fine precipitated calcium carbonate has been placed under allocation by Order M-340, effective April 1. WPB officials explained that the ultra-fine calcium carbonate is not to be confused with the ordinary types of precipitated calcium carbonate. It is used to impart tensile strength to rubber and also in rubber druggists' sundries and as a pigment for inks and paint. WPB officials said they hoped to take care of essential uses under the allocation program, but that the shortage is expected to be further intensified in the next few months.

Personnel Notes

Rubber Director Bradley Dewey reported March 29 that L. D. Tompkins, Deputy Rubber Director, will continue with his duties in the ORD after taking a brief rest in accordance with orders from his physician.

"Mr. Tompkins had submitted his resignation, but I and others have persuaded him to remain temporarily," Mr. Dewey said. "After a few weeks of much needed rest, Mr. Tompkins has agreed he will spend as much time as his health will permit to the completion of the rubber program. During his absence, the responsibility of his office will be carried by the assistant deputy rubber director, J. F. Clark, and L. E. Spencer, assistant director of Operations Division, together with other well-qualified members of his staff who have charge of production, priorities, allocations and supervision of end-products."

The Home Canning Jar Ring Manufacturers Industry Advisory Committee held its first meeting April 5. Lewis F. Gayner, WPB Containers Division, is government presiding officer, and committee members are: E. F. Brownworth, United States Rubber Co., New York, N. Y.; E. T. Comly, Acme Rubber Mfg. Co., Trenton, N. J.; Ralph E. Conder, Boston Woven Hose & Rubber Co., Boston, Mass.; A. B. Cornell,

Hamilton Rubber Mfg. Co., Trenton; F. W. Frerichs, Cupples Co., St. Louis, Mo.; Arthur Kendall, Crunden Martin Mfg. Co., St. Louis; B. J. Lee, Jenkins Bros., Bridgeport, Conn.; J. J. McCarthy, Crown Cork & Seal Co., Baltimore; Alvin M. Owsley, Ball Brothers, Muncie, Ind.; and W. F. Schacht, Schacht Rubber Mfg. Co., Huntington, Ind.

Technical production problems were the principal topic discussed at the April 5 meeting. Using from 10 to 15% Buna S and the balance reclaimed rubber, jar ring manufacturers are encountering some difficulties not experienced with natural rubber. A task committee was appointed to explore these problems and recommend solutions. Production of jar rings is at the rate necessary to provide for this season's home canning program. Instructions in the use of wartime rubber jar rings will later be issued to the housewife.

OHIO

Goodrich's New Synthetic

An improved general-purpose synthetic rubber of the butadiene type, resulting from discoveries made in the laboratories of The B. F. Goodrich Co., Akron, as part of a cooperative research program undertaken under government sponsorship, was announced recently by John L. Collyer, Goodrich president. For reasons of security, complete information on the new rubber will not be available to the public until after the war, but it was said that introduction of certain abundant natural material into the process for the production of this synthetic rubber resulted in an improved product which approaches natural rubber in processing characteristics.

Through the cooperation of Rubber Director Bradley Dewey permission has been obtained from the proper government agencies so that substantial production of the new rubber can be undertaken immediately in one of the plants being operated by Goodrich for the government. It is expected, however, that it will be several months before the availability of the new material will be such that it could help solve some of the serious problems involved in making heavy-duty tires of synthetic rubber. Tires made of this rubber, now undergoing extensive tests, show reduction in tread cracking and increased resistance to road wear. As this new material has greater tackiness, rubber *manufacturing difficulties* are lessened as compared with the other synthetic rubbers. No major capital expenditures or changes in present equipment of the existing government plants are required, it was stated.

Work on this development was started by Charles F. Fryling, of the Goodrich research staff, more than two years ago in the company's laboratories and has been continued in Akron and elsewhere ever since in the effort to contribute a superior material for general use in the production of war products and civilian truck, bus, and passenger-car tires.

Mr. Collyer told company stockholders at their annual gathering in New York on April 18 that with synthetic rubber now being produced at an annual rate of more than 700,000 tons, new manpower problems are arising in practically every branch of rubber manufacturing.

More than 50,000 tons of general-purpose synthetic rubber have been produced in the government plant at Louisville, Ky., by the Goodrich company, according to W. S. Richardson, general manager of the company's chemical division. The plant began operations in November, 1942, and by March 21 had turned out more rubber than the United States obtained last year from Latin America, Africa, and Mexico, stated Mr. Richardson. One of the major units in the government rubber-making program, but not the largest, the Louisville plant is currently exceeding its annual rated capacity of 60,000 tons of rubber, Mr. Richardson declared. Goodrich operates two other large synthetic rubber plants.

W. W. Scull has been appointed manager of the synthetic rubber plant being operated at Port Neches, Tex., by Goodrich for the government, it is announced by William I. Burt, general manager of plants of the company's chemical division. Mr. Scull, who came to Goodrich in 1929, has had wide experience in the purchasing and sales branches of the company, and had been operations manager of the Port Neches plant since last July. He succeeds W. J. Piggott, who resigned to go into business for himself.

John D. Beebe has been named manager of a new department, rubber suspension sales, according to E. F. Tomlinson, general manager, industrial products sales division. The new department will have charge of sales of the company's Torsilastic rubber springs and its line of Vibro-Insulators, made of rubber and metal primarily for the elimination of vibration, rubber parts for street cars, and devices for sound dampening. Mr. Beebe joined Goodrich in 1923 as a salesman of industrial rubber products in the Denver district, and was in sales posts in the industrial products division at Akron headquarters since 1928.

George Wertz and Don Schlemmer have also been assigned to the new department.

Charles W. Staacke has resumed his duties as belting sales engineer for Goodrich after many months on special war assignments as a civilian specialist on rubber problems, during which he had duty in North Africa, China, Australia, India, New Guinea, New Caledonia, and the Solomon and Gilbert islands in the Pacific.

Seiberling Personnel Changes

A major reorganization of the production department of Seiberling Rubber Co., Akron, to place emphasis on increased tire production and the postwar development of other products, was announced last month by Harry P. Schrank, vice president in charge of production. Thus Arthur A. Leedy, production superintendent for the past eight years, becomes manager of tire and tube production and of the engineering division, with complete supervision of the newly increased factory equipment. William J. Roscoe, for five years manager of the mechanical rubber division, was made manager of the newly created rubber and related products division and will be in charge of production and development of everything except tires and tubes. Assisting Mr. Leedy as production superintendent will be J. Rex Keyser, former general foreman of milling and calendering. Leo Pettitt, formerly general foreman of molded goods production, was named production superintendent of the rubber and related products division.

Robert M. McPherson, a civilian employe of the War Department Engineer Board until December, when he joined the Seiberling mechanical rubber division, was put in charge of postwar product studies for the rubber and related products division. He is a former employe of the Goodyear Tire & Rubber Co. Harry B. Cash, a former B. F. Goodrich Co. superintendent, was placed in charge of industrial engineering. He has been supervising layout of the company's plant expansion, now largely in operation. James S. Johnson, former assistant to Mr. Keyser, becomes general foreman of the milling and calendering departments.

As a result of an unauthorized strike on April 6 and 7 of 82 workers in the truck tire building department, President Seiberling made public a letter addressed to all Seiberling employes in which he pointed out that at about the same time the tire builders staged their strike, notification was received by a woman worker in another department that her husband had been killed in action and by a worker in the traffic department, that his son, a former Seiberling employe, had also been killed in action. Mr. Seiberling's letter went on to say that:

"The occurrences and observations of these past eight days have caused me, speaking as executive officer of this plant, to arrive at the following conclusions and to make the following declarations: First: So long as the war lasts, we of Seiberling are going to continue to give the war effort the best we know how to produce. Second: So long as the war lasts, if another strike occurs in this plant, the Army-Navy "E" flag with its white star will be taken down from its staff and returned to the Undersecretary of War, from whom it came, with abject apologies. Third: So long as the war lasts, any Seiberling employe who leads a strike, or incites others to strike in our plant, will not be permitted to reenter or resume work for Seiberling."

The letter went on to say that the plant management was pledged to continue to do everything in its power to hear and adjust grievances quickly and as fairly as they know how and to do everything within their power to bring such grievances to a speedy conclusion. The management only asks that the workers pledge themselves to the same objectives as outlined since, "there can be no compromise with those who would put their selfishness ahead of Victory and Peace," the letter concludes.

Goodyear Appointments

Goodyear Tire & Rubber Co., Akron, reelected Paul W. Litchfield chief executive officer and chairman of the board at a directors meeting March 27. All other executive officers including E. J. Thomas, president, were reelected. The directors meeting followed the stockholders' session when the board also was reelected.

George H. Reynolds, general foreman of Corsair test and service operation at Goodyear Aircraft, has been made production superintendent of Goodyear's synthetic rubber plant at Akron. With the company since 1928, Mr. Reynolds reported to Aircraft in May, 1942, from Sydney, Australia, where he had been division superintendent of the Goodyear plant.

Goodyear last month revealed several changes in its district managerships. Wm. A. Kemmel has been transferred to Akron as manager of the truck tire division, replacing Frank N. Thomas, now on leave of absence. Succeeding Mr. Kemmel as district manager at Los Angeles is Oliver E. Miles, who, in turn, is succeeded as district manager at Charlotte, N. C., by Claude A. Plumlee, who formerly held the same

position at Houston, Tex. This post has been assigned to John A. Nolde, assistant district manager at Kansas City, Mo., succeeded as such by L. W. C. Dye. A. Phid. Bethel, district manager at St Louis, Mo., who retired after 33 years with the company, has been replaced by George W. Dempsey, manager of the Oklahoma City district, now in charge of Mark C. McAlonan, from the truck tire division at Akron. I. M. Quinn, assigned to the New York district on a special assignment, has been succeeded as district manager in Newark by Harry J. Ryan, from the Goodyear petroleum sales division in Philadelphia.

Carl A. Crafts, who joined Goodyear in 1927 in its Boston sales department and lately served as manager of the tire retreading and repair division, last month became manager of the dealer division at Akron.

Lester M. Bradley, Goodyear representative recently returned from a 35,320-mile trip by air to South America, Africa, India, and Great Britain, which was a tire production mission for the Army Air Forces, predicted global trade of almost unbelievable volume, made possible by the wartime development of air transport, will be an outstanding feature of the postwar world. He further believes air transport will also revolutionize some of our sales and distribution methods.

Products Development

A new and simple method for bonding wood to metal, achieved by the creation of a new type of rubber-like adhesive, has been announced by L. B. Sebrell, director of the Goodyear research laboratory. The new material is called Pliobond. By means of the new adhesive, it is possible to cement a layer of plywood only $\frac{1}{48}$-inch thick to a metal surface. A metal sheet of any thickness thus covered with a layer of any desired wood can then be handled in the same fashion as the sheet alone. It can be bent into any shape or cut with a shears or stamping press without cracking the wood or pulling it loose from the metal.

Until the development of Pliobond, no adhesive was available that would accomplish this result. Plywood bonded to metal had come into general use prior to World War II, but the bond was produced by an involved process necessitating the use of critical strategic materials unavailable after the war began. The new process is reported as far simpler and requires no use of critical materials. Improvements in the design of building interiors, furniture, airplanes, automobiles, railway cars, and ships are anticipated for the postwar period as a result of this new and simple bonding method.

Harry L. Post, manager of the Goodyear shoe products department, has announced a new plastic sole for men and women's footwear. The material, named "Kavtex" after William E. Kavenagh, of the shoe products development department, who developed the new item is derived from a vinyl chloride base enabling the salvage of scrap or "tailings" from other products made with the same plastic. Small portions of GR-S are compounded with it to increase the flex life and to permit the same efficiency in stitching as is obtained with other sole materials. The claimed advantages of "Kavtex" are its greater lightness and usual rigidity for additional walking comfort. It is also impervious to moisture and retains its original shade without fading at the edges. So far it has been used only for women's footwear, although it will be definitely extended to men's. Often "Kavtex" is applied to the bottom of shoes by cement instead of stitching, to increase the lightness.

Goodyear has developed the "Hull-Vent" hose, a new type to speed welding operations in the hulls of seagoing vessels. Made with a synthetic rubber covering said to resist damage if live flame from acetylene torches or other sources come in contact with it, previously a barrier to use of any other types of air conduit except metal, the new hose was designed to provide unremitting supplies of fresh air for the workers in ship hulls by vacuum carry away of fumes. It is used to replace the metal air conduits bent and frequently broken in a few days by being pulled through narrow apertures and from the impacts of heavy objects. Another claimed advantage is its flexible wire reenforced construction to resist damage from sharp bends and kinking.

W. C. Winings, manager of Goodyear's mechanical goods division, reports development of a new steel cable "compass" conveyer belt, in which the cables are laid in parallel, side-by-side for the full length of the belt in a single plane, to make possible conveyer operations extending as far as $6\frac{1}{2}$ miles in a single belt. The cables are brass-plated prior to being covered with rubber, thus obtaining adhesions said to be much higher than were possible in steel-to-cotton. The flex life of the cables used exceeds that of cotton-cord, rope, or fabric. With steel cables not exceeding $\frac{3}{32}$-inch OD and an overall belt thickness no greater than the conventional six-ply structure, a strength equivalent to 60 plies of heavy duck is claimed.

Goodyear after the war plans the adaptation of Pliofilm for collapsible tubes for packaging in attractive colors such items as shaving cream and tooth paste. The tubes are made by wrapping strips of Pliofilm spirally into a heat-sealed tube; then the Pliofilm is heat-sealed at the bottom into an integrated bond.

Goodyear is expanding its retreading facilities to help meet the acute farm tire situation. Equipment for retreading farm tractor tires was placed in operation by April 15 in Minneapolis, Des Moines, Kansas City, Atlanta, and Philadelphia, Julian J. Wilson, manager of the company's tire treading and repair division, reported. By mid-summer facilities will be available for tractor tire retreading in six other centers, he said.

In cooperation with the United States Bureau of Mines, Goodyear recently completed a sound motion picture, "Synthetic Rubber," which traces the history of the development of the first rubber-like material in 1892 to present-day production methods, especially of GR-S and GR-N. Other possible sources of rubber, as milkweed, guayule, *kak-saghyz*, *Cryptostegia*, etc., are also considered. Free loan of this 16-millimeter film, with running time of 28 minutes, can be arranged through either the Goodyear company or the Bureau of Mines Experiment Station, 4800 Forbes St., Pittsburgh 13, Pa.

The Timken Roller Bearing Co., Canton 6, has made James F. Reid, former deputy chief of the WPB Alloy Steel Branch, production manager. He had been production manager of the Timken steel and tube division before obtaining leave of absence in May, 1942 to join WPB. His activities and responsibilities in this new capacity extend to all divisions of the company. James Reid first joined Timken 25 years ago in the production department, becoming, after ten years, production manager of the Steel and Tube Division.

Firestone Tire & Rubber Co., Akron, is calling for redemption on May 1 through operation of the sinking fund, a total of $1,223,000 of the 20-year 3% debentures due May 1, 1961. The redemption price of each bond is 100¾% of the principal plus accrued interest to May 1, 1944.

A synthetic rubber development that will improve the bullet-sealing qualities of gasoline fuel and oil tanks used on airplanes, that will facilitate tire production, and that will conserve the limited supply of natural rubber was announced March 28 by John W. Thomas, chairman of the board of the Firestone company. This special technique produces a modified rubber, a small amount of which, when mixed with a large amount of synthetic rubber, gives the needed quality of cohesion or tackiness. In line with its wartime policy Firestone has made this new process available to the industry.

Firestone has also announced the development of a weather- and wear-proof rifle cover for the Armed Services, made of its synthetic fiber, Velon. By means of this cloth cover the rifle is protected from rain, dew, and sand and may be fired while the cover is in place, since Velon is non-inflammable and unaffected by oils or greases. This plastic fiber, which is being made almost exclusively for the Armed Forces, is considered to have an excellent postwar future in the upholstery field and for shoes, hats, hosiery, luggage and seat covers for automobiles, in railroad cars, and in airplanes.

Thirty engineers, chemists, physicists, and metallurgists from General Motors Corp., Detroit, Mich., recently visited the Firestone plant to witness some of the latest developments in the production of tires and other industrial rubber goods.

Warren W. Leigh has resigned as special assistant to the Deputy Rubber Director of the WPB to join Ralph C. Busbey in organizing the firm of Busbey & Leigh, management consultants, 316 Water St., Akron, O. Dr. Leigh served with the WPB for more than a year, previously acting as price consultant and head of the OPA tire price section and before that as head of the commerce department and professor of business administration of the University of Akron. Mr. Busbey is head of the Busbey Advertising Agency of Akron, and for 15 years prior was in the publishing field serving tire manufacturers, dealers, super-service stations, retreaders, etc. With their combined broad experience in the tire and allied marketing fields, Busbey & Leigh will deal extensively with post-war planning in the tire and retread and rubber goods field, offering, in addition, complete advertising, marketing, research, and business analysis services.

General Tire & Rubber Co., Akron, at its recent stockholders' meeting elected Cyril F. O'Neil and Hayes R. Jenkins directors. The former, brother of William O'Neil, president, has been with the company since his graduation from Holy Cross. He transferred from the Akron offices to Cleveland, where he has been distributer since 1922. After serving as an officer in the naval air forces in the last war, Mr. O'Neil became a member of the Q.B.s, organization of old-time pilots. In Cleveland he has been prominent in civic affairs, acting in important capacities with the Community Fund and with Catholic Charities. Mr. Jenkins came to General direct from Western Reserve in 1928, became general counsel in 1928, assistant secretary in 1933, and secretary of the company in 1940.

EASTERN AND SOUTHERN

Intercontinental Report

Intercontinental Rubber Co., 745 Fifth Ave., New York, N. Y., in its annual report to stockholders revealed that last year its rubber production was confined to subsidiaries in Mexico, Continental-Mexican Rubber Co., Cia. Explotadora de Hule, S. A., and Cia. Ganadera y Textil de Cedros, S. A., and totaled 13,451,700 pounds, as contrasted with 12,663,800 pounds in 1942. All the rubber came from guayule shrub and was sold to the United States Government for war purposes. The supply of wild shrub will probably sustain the present scale of operations until the end of 1945, and thereafter the volume of production will depend chiefly upon the availability of cultivated shrub. The shrub cultivation program has met with many difficulties and delays. It has been hard to get properly organized for this new work under Mexican conditions. Men with Mexican experience and agricultural knowledge are scarce; water for irrigation has been a serious problem under the law limiting guayule planting to virgin land removed from agrarian colonies; the obtaining of special machinery has been slow, and training men in its use has been difficult. However these difficulties are being overcome, and the company's program is proceeding. Field planting is being expedited and augmented by the purchase of seedlings from the United States Department of Agriculture, and water developments are being prosecuted vigorously. Nothing can be proved until the first crop is harvested in 1946, but all indications are favorable so far.

The litigation regarding the Cedros Hacienda was settled by decision of the Mexican Supreme Court early in 1943, and the large damages, previously assessed, were cancelled. The Mexican Government is now owner of the 375,000 acres under litigation, and the Intercontinental company is at present in possession of the balance of the Hacienda that had not been previously allotted by the Mexican Government to agrarians. But the tenure of this large acreage is prohibited under Mexican laws, and the terms of certain contracts with the Mexican Government were fixed by Mexican Presidential Decree issued in 1944, providing that under such contracts when executed title to the balance of the acreage is to be surrendered to the Mexican Government and rights to harvest guayule shrub for a period of 50 years on the total acreage owned by the government are to be conferred on one of the company's Mexican subsidiaries, and the company is to have control of 25,000 acres for shrub cultivation purposes, in addition to the 12,500 acres held now under title for industrial purposes. It is expected that the contracts will be executed in the near future.

Foster D. Snell, Inc., consulting engineer and chemist, 305 Washington St., Brooklyn 1, N. Y., has purchased the National Calibration Service, also of Brooklyn, which it will operate as a separate department. The principal business of National Calibration was verification of vertical compression and tensile testing machines.

Alfred O. Redland, vice president and treasurer of the Vulcanized Rubber Co., Morrisville, Pa., has been elected to membership in the Controllers Institute of America, 1 E. 42nd St., New York 17, N. Y.

Ralph B. Symons

E. F. Drew & Co., Inc., Boonton, N. J., has announced that Ralph B. Symons, formerly with the Firestone Tire & Rubber Co., has joined its staff to head technical service for the rubber, plastics, and allied fields and handle sales development work on new products created by company research. Mr. Symons, who was born in Brantwood, Ont., Canada, in 1910 and graduated from the University of Toronto in 1933 with a degree in chemical engineering, was with Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., from 1933 to 1937 and then with Canada Wire & Cable Co., Ltd., Leaside, Ont., which he left in 1941 to join the Firestone organization, serving at its Fall River, Mass., and Nebraska plants. The Drew company manufactures the S. C. plasticizers distributed by the Standard Chemical Co., Akron, O., and is at present working on several new plasticizers and other materials for natural and synthetic rubber compounding.

Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y., revealed that its Houston, Tex., plant, the first commercial plant in the United States, built and operated months before Pearl Harbor, for the manufacturing of butadiene from petroleum, in 1942 produced more butadiene than any other source in the nation. As part of the country's synthetic rubber program, another plant, at Torrance, Calif., being operated by Shell, alone expects to make available enough butadiene to manufacture between 100,000,000 and 120,000,000 pounds of rubber annually. Shell's scientists are continuing their research to improve production, recovery, and purification of butadiene, and just recently they developed a process for quantity production of methylpentadiene from propylene, a compound still available in large quantities. It is expected that this discovery will be another advance in the development of better bases for synthetic rubber.

The Thermoid Co., Trenton, N. J., and its domestic subsidiaries reported February sales at $2,054,934, contrasted with $1,545,835 in February, 1943. Sales for the first two months this year amounted to $3,573,934, against $2,974,835 a year earlier.

Rainwear Manufacturers Unite

A meeting was held by the rainwear manufacturers on April 4 at the Waldorf-Astoria Hotel, New York, N. Y., to form a national organization to be known as the National Rainwear Manufacturers Association. Its formation was brought about mainly through the efforts of Fred Monosson, Cosmopolitan Mfg. Co., Cambridge, Mass., and Simon Cohen, Jr., Deb Coat & Suit Co., New York, aided by committees from the New England Rainwear Manufacturers Association, the New York Raincoat Manufacturers Association, and representatives of western rainwear concerns.

The speakers of the day included Mr. Cohen, chairman of the meeting, Mr. Monosson, Moe Sherman, Sherman Bros., New York, M. A. Sunderland, Triangle Raincoat Co., Youngstown, O., Earl Constantine, president of the National Association of Hosiery Manufacturers, and Mr. Gordon, of the New York Regional Office of the United States Department of Commerce. Mr. Cohen outlined the purposes of the organization: to promote progress and cooperation among the manufacturers and with the related government agencies, and interpret and advise on new government legislation affecting the industry. It will also conduct research on postwar planning to foresee future changes in fabrics, machinery, marketing, etc. Mr. Monosson and Mr. Sunderland stressed the fact that the Association will not duplicate the work of the local rainwear associations or groups such as The Rubber Manufacturers Association, Inc., or will it deal with labor problems which have always been handled locally. Their aims are to represent the industry in its common problems.

Open discussion followed the speeches, and then a unanimous vote was taken to form the proposed association. The following officers were elected: president, Mr. Monosson; first vice president, Mr. Cohen; vice presidents, F. F. Somers, Rainfair, Inc., Racine, Wis., and Robert Cable, Cable Raincoat Co., Boston, Mass.; secretary, Sidney Harris, Harris Raincoat Co., New York; treasurer, Mr. Sherman. The directors consist of seventeen regional representatives: New England, Mr. Monosson, Mr. Cable, M. Salib, Plymouth Mfg. Co., Boston, Harry Elson, Belmont Garment Co., John Wigon, Kenmore Garment Co., Sam Furman, Universal Coat Co., Boston; New York, Messrs. Cohen, Harris and Sherman, Charles Plottel, Plottel Bros., David Asch, Quality Coat Co., Wm. Klothe, Weathercraft, all of New York; West, Mr. Somers, W. Pollow, Puritan Raincoat Co., Mr. Sunderland, Sidney H. Stern, Arrow Importing Co., Cleveland, O., and Al Zuckert, Racine, Wis.

The tentative headquarters of the Association are located at 701 Seventh Ave., New York.

S. S. White Dental Mfg. Co., Philadelphia, Pa., last month observed its one-hundredth anniversary.

Raybestos-Manhattan, Inc., Passaic, N. J., on April 4 held its annual stockholders' meeting in New York, N. Y., at which all directors were reelected. Then the board met to reelect all officers with two new vice presidents as follows: Harry E. Smith, general manager of The Manhattan Rubber Mfg. Division, Passaic, and Robert B. Davis, general manager of The Raybestos Division, Stratford, Conn. The two are also members of the board.

Non-Rationed Soling Shown

The fall opening of the Shoe Manufacturers' Show occurred at the Hotel New Yorker, New York, N. Y., April 17-19. Nearly 300 lines of popular-priced footwear were displayed, especially non-rationed models.

Three new types of rubber conserving non-rationed solings were featured, under the sponsorship of Elliot E. Simpson. The first, Ruberlyke, has the appearance and characteristics of rubber, but contains neither rubber nor critical plastics. The present Ruberlyke is black, although experiments have been conducted with colors, but these types are not yet ready for commercial sale. The second soling, high-grade friction shoe sole, is made from adhesive tape, tire friction, and cloth scrap from scrap rubber piles and comes in a design of both checks and ribbing. The third type is of plied-up duck rejected by the Army, treated with non-rationed plastics and laminated. Wooden, treated felt, and rubber soled shoes were also shown, but the emphasis was placed on the three new types because of their advantages over wood and felt and the fact that they are non-rationed. The new developments have been on the market since December, but this is the first time that they have been featured in a shoe show.

Among the manufacturers and dealers represented by Mr. Simpson were: Norwalk Tire & Rubber Co., Atlantic Tubing & Rubber Co., Triplewear, Inc., American Rubber Products Co., L. Drexage Co., T. A. Maguire & Co., Inc., and Simpson's Walker-Woods, Inc.

Committee for Economic Development, 285 Madison Ave., New York 17, N. Y., has organized a business appraisal of postwar markets to a degree of detail never before attempted, to be undertaken with the cooperation of 581 leading trade associations in manufacturing fields. This announcement comes from T. G. MacGowan, manager, marketing research department, Firestone Tire & Rubber Co., Akron, O., and chairman of the C.E.D.'s marketing committee. Among the other members of this large committee are: John M. Bickel, vice president, Carrier Corp., Syracuse, N. Y., and Frank U. Surface, director of sales research, Standard Oil Co. of New Jersey, New York.

American Viscose Corp., 350 Fifth Ave., New York, N. Y., is rapidly completing installation and conversion of equipment to produce higher-strength viscose rayon yarn for use in tire cords and fabric, as part of the WPB program to provide rayon for airplane, military, and synthetic rubber tires. Final plans call for an annual production by the company of about 110,000,000 pounds of higher-strength rayon yarn for use in tires, nearly half the approximately 240,000,000 pounds of rayon tire cord yarn planned for in the WPB program. The greater part of the company's output will come from its Front Royal, Va., plant, being enlarged to produce 82,000,000 pounds of rayon tire cord a year. The plant's new facilities will be in complete operation, it is expected, by the Spring of 1945. The company's Lewistown, Pa., plant, converting existing equipment to make approximately 22,000,000 pounds annually of tire cord yarn, expects to start this production about June 1. The Marcus Hook, Pa., plant will produce approximately 6,000,000 pounds of tire cord yard annually and will complete conversion of equipment for this purpose by May 1.

N. A. W. M. D. Annual Meeting

The National Association of Waste Material Dealers, Inc., recently held its thirty-first annual convention and war conference at the Hotel Astor, New York, N. Y., which attracted a record attendance. Election of officers was held with the following results: president and chairman of the board, Paul J. White; first vice president, Joseph H. Tyroler; second vice president, Julius Muehlstein; third vice president, Robert Miller; secretary-treasurer, Chas. M. Haskins.

Among the directors are: Nat E. Berzen, president, Nat E. Berzen, Inc., 551 Fifth Ave., New York; David Feinburg, president, David Feinburg Co., Medford, Mass.; David Golub, manager, Charles Harley Co., 650 Seventh St., San Francisco, Calif.; Mr. Muehlstein, treasurer, H. Muehlstein & Co., Inc., 122 E. 42nd St., New York; and Jack Sider, president, The Loewenthal Co., Chicago, Ill.

The annual meeting of the Scrap Rubber Institute also was held during the convention. The meeting, called to order by Alex Schulman, president of the Institute, was one of the largest ever held. The following officers and executive committee were elected for the ensuing year: president, Mr. Schulman, president, A. Schulman, Inc., Akron, O.; vice president, A. Lowenstein, scrap rubber dealer, 237 Ridgewood Ave., Newark, N. J.; secretary-treasurer, Mr. Haskins; executive committee: Mr. Berzen; Samuel L. Bierman; Irwin M. Desser, president, Desser Tire & Rubber Co., 6208 S. Alameda St., Los Angeles, Calif.; Mr. Feinburg; J. K. McElligott, executive vice president, Loewenthal Co.; Nathan Lakin; and Mr. Muehlstein. There was considerable discussion covering the future of synthetic rubber, and it seemed the consensus of those present that a poster or some form of printed material be issued to scrap rubber dealers throughout the country to assist them in the classification of the new types of synthetic rubber now finding their way into the waste pile. It was pointed out that this was particularly true at Army camps throughout the country. Mr. Schulman appointed a special committee to consider this matter, consisting of Messrs. Muehlstein, Berzen, Lowenstein, McElligott, and Feinburg. It is anticipated that the executive committee will meet in New York shortly to go further into suggestions made at the annual meeting.

Thiokol Names New Officers

At the annual meeting of stockholders of the Thiokol Corp., held at Trenton, N. J., April 17, J. C. Patrick, discoverer of "Thiokol" polysulphide rubber, was elected chairman of the board. J. W. Crosby, sales manager for many years, was elected vice president and general manager; while H. R. Ferguson, also made a vice president, will continue in charge of the company's plant operation and new product development. Edward P. Roll, Jr., who left the WPB a year ago to join the organization as treasurer was reelected; and S. M. Martin, Jr., long associated with the company as manager of the rubber development laboratories, was named secretary. The present board, consisting of Dr. Patrick, Hadley Case, Frank Stoner, Murray McConnel, William Spencer, and David Soosland was reelected, and C. Emmett Reid was elected a director to fill the vacancy caused by the recent death of Bevis Longstreth, president of the company. The position of president will not be filled.

Safety Council Exhibit

The Greater New York Safety Council and cooperating agencies held their fifteenth annual safety convention and exposition at the Hotel Pennsylvania, New York, N. Y., on March 28, 29, and 30. Among the speakers were H. W. Lundin, of Monsanto Chemical Co., St. Louis, Mo.; G. F. A. Stutz, N. J. Zinc Co., Palmerton, Pa.; Matt Denning, of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.; D. A. Irwin, of Aluminum Co. of America, Pittsburgh, Pa.; and George K. McKenzie, of Flintkote Co., New York; Roy S. Bonsib, Standard Oil Co. of New Jersey, New York.

W. W. Bond, of Anaconda Wire & Cable Co., New York, was on the exhibit committee; Harry P. Heubner, of Flintkote, and Dennis A. Sweeney, of Anaconda, on arrangements; L. T. Carpenter, of United States Rubber Co., and Norris Millington, of Shell Oil Co., on publicity; and Mr. McKenzie, Leroy G. Bamer, of Carbide & Carbon Chemicals Corp., and Harold J. Segrave, of Mine Safety Appliances Co., on the program committee.

The absence of the use of rubber was notable as substitutes were used wherever possible. What there was was mainly reclaimed rubber and neoprene. The Standard Safety Equipment Co., Chicago, Ill., featured fireproof factory clothing of neoprene coated duck. Dunn Products, Chicago, had aprons and gloves of both natural rubber and neoprene. It also featured aprons of a silverized reclaimed rubber left over from airplane lifeboats. They are salt water resistant and were silverized for camouflage purposes. The firm also had hard rubber pails and dippers, resistant to high heat and acids. Mine Safety Appliances showed gas masks and respirators of natural rubber, as reclaimed rubber cannot be used next to the face. Also exhibiting were the Davis Emergency Equipment Co., Newark, N. J., and Lehigh Safety Shoe Co., Inc., Allentown, Pa.

The Meyer & Brown Corp., crude rubber dealer and importer, 347 Madison Ave., New York, N. Y., has announced that Phillip N. Felleman has joined the corporation as vice president. Mr. Felleman has had wide experience in the field, having been with H. Muehlstein & Co., Inc., in executive capacities for over 18 years. During that period he was, at different times, resident manager in Boston and Akron, secretary of the Leo Meyer Co., Akron, and president of Alligator Rubber Products, Akron. The business being carried on by the Meyer & Brown Corp. was founded in 1894 by A. T. Morse to deal in crude rubber, and in 1912 was purchased by Otto Meyer and Andrew Brown, who were junior partners, and has since been operated by that corporation. In addition to servicing Rubber Reserve Co. permits for crude and synthetic, the corporation as of April 1 began dealing in scrap rubber, synthetics, and plastics, the new department being under the direction of Mr. Felleman, who during his business career has specialized in scrap rubber, synthetics, etc.

Brill Equipment Co., dealer in machinery, has moved its offices and warehouse from 183 Varick St., New York 14, N. Y., where it was located for the past 12 years, to 225 W. 34th St., New York 1. The new warehouse and shop, however, will be situated at 2401 Third Ave., Bronx, N. Y. Consistent growth of the firm enabled this move to larger quarters.

Carrier Appointments

Carrier Corp., Syracuse, N. Y., manufacturer of air conditioning refrigerating, and heating equipment, has announced the addition of William A. Pennington to the research staff of its engineering division, headed by Vice President Herbert L. Laube. Dr. Pennington will devote himself to Carrier's metallurgical and chemical problems, including a number of research projects connected with the company's preparation of new and redesigned products for the postwar period.

C. M. Stuart, staff assistant to the president of Carrier, has been granted leave of absence to become deputy chief of the Special Equipment Branch, General Industrial Equipment Division, Office of Operations, WPB. The refrigeration and air conditioning section is part of this branch.

E. T. Murphy, senior vice president, has announced the resignation because of ill health of R. L. Tomlinson, for 21 years manager of the marine department. Leo Starr and J. R. Lewis, of the department, have been appointed sales and operations managers of the department, respectively. Mr. Starr has been with Carrier for 21 years; while Mr. Lewis joined in 1931. They will report to James A. Bentley, vice president, who will direct the affairs of the marine department in addition to his present responsibilities.

Heman Greenwood, vice president in charge of Carrier International Division, last month also announced two new appointments on its foreign sales staff. Colin McCulloch was made market research manager on Mr. Greenwood's staff at the company's Syracuse headquarters and transferred from the International Division's offices in Washington to assume his new duties on April 15. A native of Great Britain, he joined Carrier in 1941 after 20 years' experience in Europe and the Near and Far East as sales representative for British and American manufacturers. Wm. A. Haile became manager of the Washington offices. A veteran of United States export trade, engaged for many years in foreign sales of industrial machinery, Mr. Haile left the WPB Diesel engine division for Carrier.

E. J. McCormick Rubber Co., Inc., Ridgefield Park, N. J., on March 24 filed a petition in the United States District Court, District of New Jersey, proposing reorganization under the provisions of Chapter X of the Act of Congress relating to bankruptcy, which was approved, and Arthur J. O'Dea was appointed trustee. A meeting of the company's stockholders and creditors is scheduled for May 15 at the Federal Bldg., Newark, N. J., to decide whether this appointment be made permanent.

Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y., at its annual stockholders meeting April 18 elected Ralph R. Browning, Paul P. Huffard, and Homer A. Holt directors. Mr. Browning has been with units of Union Carbide for 31 years, and Mr. Huffard for 35 years. Both have been vice presidents of the corporation since 1939. Mr. Holt is a Charleston, W. Va., attorney and a former governor of the state. Then on April 25 the board named Fred H. Haggerson, vice president and director who has been with the company for 25 years, president to succeed Benjamin O'Shea, who assumed the post in 1941, but now becomes chairman of the board.

To Build Rayon Tire Cord Plant

To help meet the nation's wartime demand for more rayon tire cord, United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y., is erecting a new textile plant at Scottsville, Va., according to President Herbert E. Smith, who declared the new plant is a part of the government's program to supply more rayon tire cord needed in making synthetic rubber truck and bus tires. When completed, it will produce 12,000,000 pounds of twisted rayon tire cord a year, enough to build 600,000 medium-sized synthetic rubber truck tires. Full operation is expected by October, when about 300 people will be employed. A comprehensive training program will be started at once to utilize local labor without previous textile experience.

"Modern machinery for the twisting and weaving of rayon tire cord will be installed throughout, including mechanical and auxiliary equipment of the latest design to facilitate easy handling of raw and processed materials," Mr. Smith added. "To insure the highest quality production and to provide the best possible working conditions, the plant will be air conditioned throughout. It will be windowless, and temperature and humidity control maintained by a complete change of air every six minutes."

Cost of the new project, which, including land, building, and machinery, is estimated at $2,240,000, will be financed by the Defense Plant Corp.

Other textile mills devoted to tire cord production now being operated by U. S. Rubber are at New Bedford, Mass.; Shelbyville, Tenn.; Hogansville, Ga., and Winnsboro, S. C.

The company has placed in mass production at its Indianapolis, Ind., plant inner tubes of Butyl, said to hold air three times better than natural rubber. These synthetic rubber tubes will be used exclusively for military uses for the time being. Other claimed advantages for these new tubes are high tear resistance, no tendency to stiffen after aging, and high tolerance for foreign matter.

U. S. Rubber's synthetic rubber plant at Institute, W. Va., on April 1 celebrated its first anniversary. The full rated annual capacity, 90,000 long tons, has been exceeded substantially during each of the past five months and is still increasing. At present the plant is running at better than 125% of rated capacity. In honor of the plant's first birthday Factory Manager G. A. Graham held a party for his staff and their wives. Among those attending were D. L. McCollum, F. D. Chittenden, F. S. Cooper, Jr., Oscar Zellweger, J. K. Fleshman, G. C. Follett, N. G. Madge, and A. F. O'Keefe. Also present was John P. Coe, general manager of U. S. Rubber's synthetic rubber division.

U. S. Rubber will continue for another year its sponsorship of the Sunday afternoon radio concerts of the Philharmonic-Symphony Society.

Stockholders' Annual Meeting

Company stockholders held their annual meeting at Passaic, N. J., April 18 and increased membership on the board from 15 to 19 by the election of Willard H. Cobb, George M. Tisdale, George P. Edmonds, and Harry S. Lewis as directors. Mr. Cobb, with the company more than 30 years, is general manager of the mechanical goods, general products, and "Lastex" yarn and rubber thread divisions; while Mr. Tisdale, with the company since 1920, has been director of purchases since 1929. Mr. Edmonds is president and director of Bond Crown & Cork Co., Wilmington, Del., and Mr. Lewis is president of The J. P. Lewis Co. and also president and director of Latex Fiber Industries, Inc., jointly owned with U. S. Rubber, which operates a plant in Beaver Falls, N. Y., manufacturing fibrous materials combined with latex and dispersions.

Value of the production of U. S. Rubber for war and essential civilian purposes in 1943 was approximately $790,000,000, 120% over the preceding year, F. B. Davis, Jr., chairman of the board told shareholders. War production accounted for $652,000,000, or 83% of the total, almost three times the company's war output in 1942. Mr. Davis listed the company's war contributions in three classifications, manufacture of ammunition and explosives in government-owned plants, synthetic rubber under the government's synthetic rubber program, and a great variety and volume of war products in the company's own plants. Two new synthetic rubber plants were put into production in 1943, bringing the company's total to three with a combined rated capacity of 150,000 tons a year. The seven munitions and the three synthetic plants produced goods approximately five times the volume of government-owned plants operated by the company in 1942. The company's own manufacturing plants, 22 in United States and eight in Canada, turned out $422,271,343 worth of goods in 1943, 45% more than in 1942. Of this amount, 67% was for war products. Referring to this year's operations, Mr. Davis reported that sales of products made in the company's own plants in the first quarter of 1944 were approximately the same as in the first quarter of 1943. Earnings before taxes also were on about the same level, he declared, but pointed out that taxes were higher. He also announced that fees from operation of government-owned plants were less. On the basis of the current outlook, Mr. Davis stated, the company hopes to maintain common dividends on a regular quarterly basis.

Tompkins Resigns, Thacher Returns

Lucius D. Tompkins has resigned as a vice president of United States Rubber with which he has been associated since 1916, but will continue as a director and a consultant. In October, 1942, Mr. Tompkins was appointed Assistant Deputy Rubber Director, and in September, 1943, Deputy Rubber Director.

After a two-year leave of absence S. P. Thacher returned to U. S. Rubber on April 1, having been chief of the rubber section, Army and Navy Munitions Board, Washington, D. C. With his return to the rubber company Mr. Thacher will have charge of special-brand tire sales besides other tire engineering responsibilities with headquarters at Detroit, Mich., according to J. W. McGovern, general manager of the company's tire division. Prior to his appointment on the Munitions Board, Mr. Thacher directed the rubber conservation program for the Army Motor Transport Division. Shortly after attending the Massachusetts Institute of Technology, Mr. Thacher began his service with U. S. Rubber in 1915 as an experimental engineer. In 1919 he became technical assistant to the president; in 1925, manager of the technical service department; in 1929, general manager of tire production; in 1932, technical manager of tire development; and in 1935, manager of tire engineering and service department. He resigned from this position in March, 1942, upon being "drafted" to become special assistant to

the director of the production division, Army Service Forces.

Henry A. Mackey has been appointed manager of advertising and sales promotion for the Gillette tire division, according to W. D. Baldwin, Gillette sales manager.

Frederick W. Schaffer, in charge of quality control at the company's Naugatuck footwear plant, since 1928, retired last month after 45 years of continuous service there and was honored at a dinner given by his associates in the product development department. Mr. Schaffer began his long service in the mill room of the Goodyear India Rubber Glove Mfg. Co. and advanced through its various departments. After seven years he became assistant superintendent and in 1914 superintendent. In 1922 following merger of the Glove company with the Goodyear Metallic Rubber Shoe Co. as the Naugatuck footwear plant of U. S. Rubber, Mr. Schaffer was made technical superintendent.

H. A. Donderi, art director of U. S. Rubber, has been granted a military leave of absence for the duration to accept a commission of junior grade lieutenant with the United States Naval Reserve. He has been assigned to active duty in the office of Director of Publications in Washington, D. C.

President Smith has accepted chairmanship of the manufacturing group for the Greater New York Fund's Seventh Annual Campaign to raise $4,500,000 for 403 voluntary hospitals, health and welfare agencies. The manufacturing group covers ten major trade divisions: automotive, chemicals, electrical manufacturers and supplies, machinery, office equipment, optical products, paints, paper, radio manufacturers and distributers, and rubber.

The Foreign Economic Administration, Washington, D. C., has notified exporters that effective April 1 all commodities except a relatively few tight-supply items, including certain chemicals and rubber and rubber products, have been removed from the decentralization procedure which required exporters to submit preference request recommendations with applications for licenses to export to Brazil. FEA also revealed that import recommendations are no longer needed with applications to export six commodity groups to Colombia and Venezuela, including automotive replacement parts and accesories, batteries, and asbestos metallic yarn and friction materials.

"Current Export Bulletin No. 156", April 8, Foreign Economic Administration, informs that scrap rubber and paraffin wax require an individual license or release certificate for all exports regardless of value to destinations other than Canada.

Office of Defense Transportation, Washington, D. C., reminds operators of all types of commercial motor vehicles that they are still required to have their tires inspected periodically under ODT orders, although the OPA lifted the requirement for passenger-car tire inspection effective April 20. Under General Order ODT 21, as amended, operators of trucks, buses, and taxicabs must have their tires checked after each 5,000 miles of operation, or every six months of operation if less than 5,000 miles. Inspections are made by any agency designated by the OPA.

Col. J. Monroe Johnson has been made director of the Office of DT to succeed the late Joseph B. Eastman. Brig. Gen. Charles D. Young had been serving as acting director.

PACIFIC COAST

Plant Rubber & Asbestos Co. is constructing a new loading dock at 2120 E. 25th St., Vernon, Calif., at a cost of $3,000.

Firestone Tire & Rubber Co. of California, Los Angeles, has opened new buying offices in charge of O. V. Anderson, transferred from the parent company's Akron, O., headquarters. The new office will purchase manufactured goods of all kinds sold in the thousands of Firestone dealer outlets as well as company stores, to fill present requirements and also to round out postwar plans. Los Angeles has been settled upon as a center for Firestone postwar buying plans, Leonard K. Firestone, the California company president, declared recently, in the conviction that this area will see unprecedented increases in manufacturing when peace comes, because of its strategic location and the great force of skilled workmen available for postwar manufacturing.

Faulhaber Rubber Co. is erecting a new warehouse at 1342 E. Slauson Ave., Los Angeles, Calif., to occupy 47 by 82 feet and cost $5,500.

Synthetic Rubber Plants at L. A.

The government-owned plants in Los Angeles County, Calif., for the production of synthetic rubber and synthetic rubber raw materials which are being operated by the Southern California Gas Co., the Standard Oil Co. of California, the Shell chemical division of the Shell Union Oil Corp., the Dow Chemical Co., the Goodyear Synthetic Rubber Corp., and the United States Rubber Co., were inspected by the press on April 20 as a result of arrangements made by the Los Angeles Chamber of Commerce with the Defense Plant Corp., the Rubber Reserve Co., and the Office of the Rubber Director. A pictorial story of these plants and the processes used in them to produce 90,000 long tons of synthetic rubber per year in this area will appear next month.

Jerry A. Anson

Butylene Extraction Unit, Government Synthetic Rubber Plant, Los Angeles, Calif., Operated by Shell Chemical Division, Shell Union Oil Corp.

NEW ENGLAND

Albert P. Leonard

Farrel-Birmingham Co., Inc., Ansonia, Conn., has appointed Albert P. Leonard manager of its New York, N. Y., office to succeed Edward S. Coe, Jr., transferred to the main office as assistant to the plant manager. The company is also moving its New York office from 79 Wall St., where it has been many years, to 3700 Chrysler Bldg. Mr. Leonard comes to his new post with a broad and extensive experience in the engineering field, particularly in the sugar industry in which he has spent nearly a quarter of a century in various engineering, operating, and administrative posts. Mr. Leonard was born in Syracuse, N. Y., and for two years attended McGill University in Montreal, Canada; then his father's death placed upon him the burden of the family support. While working as draftsman and engineer he completed his engineering education at the Brooklyn Polytechnic Institute. He has worked for the Honolulu Iron Works Co., the War Department in airplane engineering and production, the Rionda Interests, Foster Wheeler Corp., Fidelity & Casualty Co. of New York, and the Canadian branch of the Babcock & Wilcox Co., in charge of the engineering of steam boilers and heat recovery equipment, steam turbines, steam engines, compressors, pumps, and other powerhouse machinery.

Boston Woven Hose & Rubber Co., Boston 3, Mass., last month announced several changes in executive personnel. Owing to ill health, A. C. Kingston, vice president and general manager, has been obliged to relinquish a large part of his duties and has been appointed consultant to the president on matters of sales policy. H. F. Maxon, district sales manager of the New York and Pennsylvania districts for the past 17 years, has been made general sales manager of the company; while W. I. Lewis, for the past 12 years assistant to the general manager, becomes assistant general sales manager. W. F. Carroll, resident representative in the Philadelphia district, succeeds Mr. Maxon as district sales manager.

Yale & Towne Mfg. Co., Chrysler Bldg., New York, N. Y., has purchased the scale business of Kron Co., Bridgeport,

Conn. This scale line, which now includes bench, platform, abattoir, hopper, crane, and hoist types and capacities for weighing and counting parts or products, batching materials in their dry state, for measuring flow or consumption of liquids, testing tensile strength of various products, the pull of motors, etc., will be under the general direction of the Philadelphia division of the Yale company, which division makes hand and electric hoists, hand lift and electric industrial trucks, and related machinery. Facilities and personnel of the Kron Co., however, will be maintained in Bridgeport as heretofore, together with the sales and service organization.

MIDWEST

Monsanto Chemical Co., St. Louis, Mo., according to F. A. Abbiati, general manager of sales, has made C. G. Gress sales manager of the Resinox department of the plastics division, with headquarters at Springfield, Mass. Mr. Gress has been with Monsanto since 1928 and since 1940 was manager of the division's Detroit branch office. Carl Whitlock, of the technical service department of the division at Springfield, who joined the company in 1941, has been named Detroit branch manager in charge of all plastics materials sales in that area.

Phillips Petroleum Co., Bartlesville, Okla., has announced that A. W. Oakleaf has joined its Philblack division as technical representative, with headquarters at Akron, O. In this capacity Mr. Oakleaf will develop new applications and uses for the new-type furnace black recently put into commercial production by Phillips. Philblack was designed primarily for synthetic rubber and offers many advantages to rubber fabricators in the processing and handling of these new materials. A native Kansan and graduate of Kansas University, Mr. Oakleaf has had diversified experience in the rubber industry and in rubber goods compounding. He was formerly technical representative for Continental Carbon Co., traveling its eastern territory, and has had years of compounding and technical experience with United States Rubber Co. and Toledo Industrial Rubber Co.

A. W. Oakleaf

Chicago Drug & Chemical Association held its forty-fourth annual meeting March 30 at the Drake Hotel, Chicago, Ill., and elected officers for the coming year. Included were Martin B. Vance, of Givaudan-Delawanna, Inc., secretary, and Gerald F. Pauley, of Monsanto Chemical Co., a director.

CANADA

The Canadian Government is engaged in negotiations with Imperial Oil, Ltd., and St. Clair Processing Corp. over payments to be made these companies for their part in the production of synthetic rubber at Polymer Corp. at Sarnia, Ont., according to a report tabled March 30 in the House of Commons at Ottawa, Ont., by Munitions Minister C. D. Howe. In the statement, made at the request of Stanley Knowles, Cooperative Commonwealth Federation M. P. for Winnipeg North-Centre, Mr. Howe said the firms are continuing their work on the strength of assurances from senior officials of the crown Polymer Corp. that they will be paid on a reasonable basis for services rendered and products supplied.

War Assets Corp., Ottawa, Ont., a Canadian crown company dealing with reallocation and disposition of war supplies, has asked the Dominion's three Armed Services, Army, Navy, and Air Force, to conduct an inventory of stocks of suspenders and rubber that any surplus might be turned over to civilians. A special request was made for spare rubbers, which are also in heavy civilian demand. About 80,000 pairs of the so-called police-type suspenders, with plenty of elastic in them, are expected to be taken from military stores. Of this lot, about 28,000 pairs will be turned back to manufacturers to be reprocessed into narrower-type suspenders, some of which will be made only partly and others entirely with elastic.

Dominion Rubber Co., Ltd., Montreal, P. Q., has announced appointment of R. D. Ratz as factory manager of the Dominion tire factory at Kitchener, Ont., through A. W. Hopton, vice-president and general manager, tire division. Mr. Ratz joined the company as assistant technical superintendent of its general rubber goods plant in Montreal in 1919, was transferred to the tire factory as technical superintendent in 1923, and was factory superintendent from 1931 until his new promotion.

G. Stafford Whitby, of the University of Akron and an international authority on rubber chemistry, spoke March 21 on "Condensation Polymers" at a meeting in Sarnia, Ont., of the Western Ontario Chemical Association. Dr. Whitby, who serves as technical consultant, chemical division, to Polymer Corp. in Sarnia, reviewed some of the more recent condensation polymers, including crystalline fibrous materials like nylon, rubbery materials, resinous materials, and also recent synthetic rubbers of the "Thiokol" type. He predicted a future widening of the field of industrial plastics and expressed confidence that the chemists of Canada would assist materially in the development.

C. D. Howe, Canadian Munitions Minister, in a report tabled in the House of Commons, Ottawa, Ont., on April 17 revealed that the total cost of the Crown Polymer Corp. at Sarnia, Ont., so far has been $49,500,000. He further stated that management fees have been $42,394.

J. H. F. Turner, Cotton Administrator, Wartime Prices & Trade Board, Ottawa, Ont., issued an order, effective March 18, permitting the use of neoprene thread as a substitute for natural rubber thread in the manufacture of fabrics produced in the basic period, provided the weight of rubber per yard and price are not changed.

James I. Simpson, president and general manager of Dunlop Tire & Rubber Co., Ltd., expressed the opinion while in Vancouver, B. C., in mid-March on a visit that establishment of branch factories on the Pacific Coast by Canadian rubber companies is possible, but certainly will not be considered until well into the postwar period. Mr. Simpson, also chairman of the rubber advisory committee to the Canadian rubber controller, said that while production has naturally increased because of wartime demands, it is doubtful if peacetime requirements will exceed plant output capacity at present available.

Moose Oils, Ltd., Calgary, Alta., reports that carbon black now is being manufactured from the oil shales in the Moose River district in the James Bay area of Canada's northland. The company states that Canada has been on the verge of not being able to meet the demand for carbon black, whereas in former years there was an overproduction. The company believes this new source of supply will eliminate the chance of a shortage.

T. M. Mayberry, secretary-treasurer, Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., was elected president of the Hamilton Chamber of Commerce.

OBITUARY

Charles A. Joslin

CHARLES A. JOSLIN, vice president and general manager of the Panther Rubber Co., Ltd., Sherbrooke, P. Q., Canada, died suddenly of a heart attack at his home on February 26. Born in Cleveland, O., on March 25, 1875, Mr. Joslin was associated with several rubber companies in Trenton, N. J., and Akron, O. Then from 1907 to 1912 he was with the North British Rubber Co., Edinburgh, Scotland. He came to Sherbrooke in 1914 to establish the Panther plant in Canada. It grew considerably in size since that time and progressed under his guidance.

Mr. Joslin was a member of the Sherbrooke Rotary Club, a founder of the Sherbrooke Country Club, a life member of the Sherbrooke Snowshoe Club, a member of St. George's Club, a former chairman of the Sherbrooke branch of the Canadian Manufacturers Association, and a member of Masonic Lodge No. 5, Trenton.

Besides his wife he leaves two sons and two daughters.

The funeral service was held at Trinity Church, Sherbrooke, February 28.

Wilbur G. Fender

PNEUMONIA caused the death late in March of Wilbur G. Fender in Australia. He was formerly sales director of Goodyear Orient Sales Co., over territory including British Malaya, Thailand, Borneo, French Indo-China, and Singapore. He had joined the sales staff of the Goodyear Export Co. in May, 1928, became, in 1931, truck and bus tire salesman in Cuba, then secretary of the Goodyear-Cuba, in 1933, and later sales manager. He was sales director of Goodyear Orient from 1937 until the outbreak of the war in the Far East, when he was commissioned captain in the United States Army. In 1943 he attained the rank of major.

Major Fender was born September 14, 1905, in Chicago, Ill., attended Englewood High School there, then Oberlin College and Ohio State University.

He leaves his widow, his mother, and a brother.

William A. Byrider

WILLIAM A. BYRIDER, veteran rubber manufacturer and president of the Oak Hill Sponge Rubber Co., Oak Hill, O., died April 18 at Cleveland, O., after a brief illness. Mr. Byrider was born in Akron in 1865. Early in the century he became associated with the late James A. Swinehart, inventor of the side-wire rubber tire and founder of the Swinehart Tire & Rubber Co. In 1903, Mr. Swinehart and Mr. Byrider organized the Colonial Tire Co. for the development and licensing of the Swinehart patents in foreign countries, and Mr. Byrider represented the company in Europe, making his headquarters in Paris. He later organized the Oak Hill Company. The deceased was also vice president of the Central Plastic Products Corp., Cleveland.

He leaves a widow, a son, William A., Jr., secretary-treasurer of the company, and three daughters.

David W. Mulford

DAVID W. MULFORD, long prominent in the shellac trade and in late years specializing in sales development for William Zinsser & Co., New York, N. Y., shellac importer and manufacturer, died March 30. About 40 years ago while associated with Henry W. Peabody & Co., Mr. Mulford introduced to the United States the scientific shellac manufactured by Angelo Brothers, Calcutta, India. In 1932 when Peabody's New York business was liquidated, the deceased joined the Zinsser organization. He was born in Elizabeth, N. J., July 1, 1880.

He belonged to the American Chemical Society, the American Society for Testing Materials, the Society of Mayflower Descendants, the United States Shellac Importers Association, and various trade groups, such as the Grinding Wheel Manufacturers Association, and various rubber groups.

Surviving are his wife and daughter.

Thomas C. Mundy

A HEART attack brought sudden death on March 27 to Thomas Clayton Mundy, since March, 1942, southern district manager of The General Tire & Rubber Co., at his home in Dallas, Tex. Born in Birmingham, Ala., June 11, 1900, he attended the local public school and had two years at Mississippi A. & M.

From 1917 to 1925 he worked for the Illinois Central Railroad, and for one year for the Cudahy Packing Co. He began his career in the rubber industry as salesman in the Southeast for the Ajax Rubber Co., in 1926. Then from 1930 to 1932 he was salesman in Tennessee for the Firestone Tire & Rubber Co. and from there went to General Tire.

Mr. Mundy was an Episcopalian. His services and burial occurred in Memphis, Tenn., March 30. His survivors are his wife, his daughter, and his mother.

Israel H. Albert

ISRAEL H. ALBERT, manufacturer and dealer in rubber mill machinery and equipment and senior member of L. Albert & Son, died suddenly at his home in Trenton, N. J., on April 1. Born in 1882, in Lithuania, Mr. Albert came to this country at an early age and attended the public schools of Trenton and Rider-Stewart Business College there.

When quite young, he associated himself with the rubber industry. In 1891 the firm which he headed was founded by his late father, Louis Albert, as the pioneer dealer and grader of scrap rubber, importing great quantities of rubber from European markets. I. H. Albert also founded and operated the Olden Rubber Mfg. Co., manufacturer of mechanical rubber goods, and the Olden Rubber Reclaiming Co., manufacturer of reclaimed rubber, both of Trenton. His greatest contribution to the rubber industry, however was his establishment and operation of the large enterprise handling exclusively rebuilt rubber mill machinery and equipment, with warehouses and plants in Trenton, Akron, O., Stoughton, Mass., and Los Angeles, Calif. Because of his wide experience in the rubber industry he was chosen in 1943 as a consultant and assistant on the staff of the Office of Rubber Director.

Mr. Albert, a noted philanthropist, was associated with Orphan Homes, Homes for the Aged, Consumptive Relief, Federation Work, Sheltering Homes, and also was a member of the board of a theological seminary of New York and various congregations in Trenton and Los Angeles. He was a 32nd degree Mason of the Grand Lodge of New York.

Services and burial took place in Trenton on April 2.

He is survived by his wife, a daughter, and two sons.

I. H. Albert

Theodore G. Joslin

THEODORE G. JOSLIN, director of public relations, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., died April 12 after a heart attack in his office.

Born in Leominster, Mass., 54 years ago he began his newspaper work with the Associated Press in Boston in 1908 and worked for the *Boston Evening Transcript*, and then *World's Work*; he also contributed articles to various weekly and monthly magazines. From March, 1931, until March, 1933, Mr. Joslin served as secretary to President Hoover and in 1933 became associated with Roger W. Babson, economist, and initiated Babson's Washington Reports. The deceased came to Wilmington in 1936 as president of the News-Journal Co. and was appointed to the du Pont company post in 1939.

He was a member of the Gridiron and the National Press Clubs in Washington, D. C., and of the Wilmington Country and Wilmington clubs.

His wife and two sons survive him.

Joseph E. Fehr

JOSEPH EARL FEHR, an engineer with the Watson-Stillman Co., Roselle, N. J., since 1938, died at his home there on April 20 after a long illness. He was born in Bethlehem, Pa. Surviving are his wife, his parents, a daughter, a brother, and a sister.

Walter H. Linck

WALTER H. LINCK, since 1926 manager of the Goodyear Glove Rubber Footwear Division of United States Rubber Co., at 195 Hudson St., New York, N. Y., died suddenly of a heart attack at his home in New York on April 7. Funeral services were held in Philadelphia, Pa., April 12.

Mr. Linck was born in Jenkintown, Pa., 61 years ago. He started his selling career in 1912 as a salesman of the Revere Rubber Co. in Philadelphia, a subsidiary of U. S. Rubber. A Blue Lodge Mason and Shriner, he leaves a brother and sister.

Herbert A. Clark

HERBERT A. CLARK, laboratory head of the Taylor Instrument Cos., Rochester, N. Y., died at his home there on April 20. He was born in Darlington, Wis., 68 years ago. He graduated from the University of Kansas, received his master's degree from the University of Nebraska, and then became assistant physicist at Columbia University and lecturer at Barnard College. After receiving his Ph.D. from Columbia in 1909, Dr. Clark became instructor in physics at Syracuse University. In 1918 he became physicist with the Taylor Instrument Cos.

He is survived by his wife, his daughter, and his sister.

New Incorporations

Associated Rubber & Plastic Corp., New York, N. Y. Capital, 260 shares, no par value. Weisman, Celler, Quinn, Allan & Spett, 1450 Broadway, New York, N. Y. Rubber products, etc.

Bush-Mar, Inc., Wilmington, Del. Capital, $100,000. Rubber, plastics.

Ideal Latex Corp., Queens, N. Y. Capital, 200 shares, no par value. George L. Cohen, 52 William St., New York, N. Y.

HELPING HANDS

The manufacture of rubber products is one of the most specialized of all industries; and because of their specialized knowledge, rubber technicians usually find no difficulty in working with the synthetic rubbers now so widely used.

However, difficulties do come up once in a while because synthetic rubber is basically different from the natural product. And, sometimes, the solution of these troubles may cause serious delays in vital war production schedules.

If this should ever happen in your plant, and you need help in a hurry, please remember that our scientists and field technicians are at your service. Perbunan synthetic rubber was developed in the Esso Laboratories of the Standard Oil Development Company, and therefore, our men know it from A to Z. They may help you eliminate a "bug" in short order—and help put your production back on schedule.

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Patents and Trade Marks

APPLICATION

United States

2,343,237. **Electric Eraser.** J. H. McElroy, Pearl River, and F. W. Kalkhuis, Orangeburg, both in N. Y.

2,343,239. **Track for Self-Laying Track-Type Vehicles in Which Laterally Spaced Reaches of Flexible Cable Extend along the Track.** R. Mayne, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,343,313. **Amusement Apparatus Including a Hull with a Substantially Circular Bottom Wall, a Substantially Cylindrical Side Wall Extending Upwardly therefrom, and a Pneumatic Tire Mounted on and Extending Around the Side Wall.** H. F. Maynes, assignor of one-half to E. C. Maynes, both of North Tonawanda, N. Y.

2,343,363. **For a Surface Coating Machine, a Thin Roll Having a Grooved Surfacing of Rubber-Like Material.** J. E. and R. S. Black, both of Mendota, Ill.

2,343,374. **Supporting Band for a Garment, including a Flat Strip of Sheet Rubber and for This Strip a Sheath of Stretchable Textile Material.** J. F. Hargreaves, assignor to Faultless Mfg. Co., both of Baltimore, Md.

2,343,476. **Brassiere.** W. Rosenthal, assignor to Maiden Form Brassiere Co., Inc., both of New York, N. Y.

2,343,477. **Boot Sock with Elastic Strips Inserted Vertically on Opposite Sides of the Leg Portions.** M. P. Ross, Burlington, Wis.

2,343,479. **For the Feed Hopper of a Mail Treating Apparatus, a Pair of Spaced, Non-Rotative Rubber-Tired Stripping Rollers.** D. Ryan and F. P. Sager, both of Los Angeles, Calif., assignors to National Postal Meter Co., Inc., Rochester, N. Y.

2,343,579. **One-Piece Pezzer Catheter.** P. A. Raiche, assignor to Davol Rubber Co., both of Providence, R. I.

2,343,584. **Rubber Valve.** C. C. Scheele, assignor to Easy Washing Machine Corp., both of Syracuse, N. Y.

2,343,585. **For Vertical Turbine Pumps, a Shaft Bearing Including a Sleeve of Rubber and One of a Plastic from the Group of Cellulose Acetate or Cellulose Acetate Butyrate Plastics.** R. D. Schott, Pomona, Calif., assignor by mesne assignments, to Joshua Hendy Iron Works, Sunnyville, Calif.

2,343,660. **In Combination, a Wheel, Including a Rim of a Plurality of Closed Spring Metal Collars, and a Rubber Tread Element Mounted thereon.** V. J. Giuseffi, West Orange, N. J.

2,343,828. **Multiple-Chambered Safety Tube.** C. J. Burkley, assignor to Wingfoot Corp., both of Akron, O.

2,343,918. **Deicing Apparatus for Propeller Spinners Including One or More Inflatable and Deflatable Cells Mounted on the Outside of the Spinner.** H. M. McCoy, Patterson Field, O.

2,343,974. **Bathing Suit of Stretchable Material Reenforced with Portions of Non-Stretchable Material.** J. Hayward, Montreal, P. Q., Canada.

2,343,996. **Inflatable Rubber Cushion for Vehicles.** G. H. Perry, Brooklyn, N. Y., assignor to Airtress Corp., of America, a corporation of N. Y.

2,344,034. **Rubber Bushing and Apertured Disk Elements as Cushioning for a Railway Car Bolster Suspension.** W. R. Elsey, Wynnewood, assignor to Pennsylvania Railroad Co., Philadelphia, both in Pa.

2,344,056. **Liquid Fuel or Lubricant Tank Cell of One or More Layers of Rubber-Like Material and a Drain Valve Fitting.** F. J. Pepersack, Towson, assignor to Glenn L. Martin Co., Middle River, both in Md.

2,344,057. **Slipper with Sponge Rubber Heel Cushion.** S. Pepitone, assignor by mesne assignments to La Marquise Footwear, Inc., both of New York, N. Y.

2,344,136. **Wrist Watch Protector Having Elastic Cords to Insure Snug Fit.** H. V. Dressen, Los Angeles, Calif.

2,344,255. **Bottle Holder.** M. H. Lichter, Honolulu, Hawaii.

2,344,350. **For the Top of Hosiery Anti-Ravel Edge with Elastic Thread Running through Several Courses.** J. L. Getaz, Maryville, Tenn.

2,344,362. **Pneumatic-Tired Vehicle Wheel.** F. J. McNulty, Los Angeles, Calif., assignor of 40% to M. Talbot, Macon, Mo.

2,344,375. **Pantie-Girdle with Elastic Sections.** Z. A. Stephens, assignor to Munsingwear Inc., both of Minneapolis, Minn.

2,344,379. **Waterproof Rain Cape.** E. H. Wallin, Arvika, assignor to C. M. Nygren, Stockberg, both in Sweden.

2,344,501. **Telephone Cable with Sheath of Rubber-Like Material.** C. E. Bennett, Ridgewood, assignor to Okonite Co., Passaic, both in N. J.

2,344,635. **Electrical Cable.** W. K. Priestley, West Barrington, R. I., assignor to United States Rubber Co., New York, N. Y.

2,344,652. **Life-Saving Apparatus Including a Single Thin Reversible Watertight Container.** E. F. Spanner, London, England.

2,344,657. **Valve Seat Construction Including Rubber Valve Seat Ring.** O. Thiel, Detroit, Mich.

2,344,669. **Rubber Face Piece for Respirators.** M. E. Barker, Washington, D. C., P. E. Young, Fairhaven, Mass., and J. N. Bruce, Edgewood Arsenal, Md., assignors to Secretary of War of the United States of America.

2,344,674. **Woman's Close-Fitting Undergarment Edged with Elastic Banding.** Z. Brown, Chicago, Ill.

2,344,718. **Oxygen Mask.** S. A. Morehouse, Glendale, Calif.

2,344,827. **Pneumatic Tire with Sidewalls Protected by a Pliable Skin Coating Composed of Asbestos, Asphalt, and Non-Oxidizing Agent.** O. Liermann, Manitowoc, Wis.

2,344,873. **Golf Ball.** H. N. Huse, Providence, R. I., assignor to United States Rubber Co., New York, N. Y.

2,344,927. **One-Piece, Seamless Hat Cover Formed from a Single Sheet of Extremely Thin, Flexible Rubber Hydrochloride.** R. J. Weikert, Covington, O.

2,344,932. **Rubber Valve Stem.** O. W. Hosking, Monroe, N. Y.

2,345,055. **Knitted Elastic Fabric.** S. C. Lilley, Hamden, and E. E. Foster, Southport, both in Conn., assignors to United Elastic Corp., Easthampton, Mass.

2,345,068. **Rubber Tire in the Form of a Circumferentially Continuous Unspliced Tube That Can Be Inflated by Means of a Valve Stem Attached to the Tire.** P. O. Pfeiffer, assignor to General Tire & Rubber Co., both of Akron, O.

2,345,143. **Airplane Float That Can Be Expanded and Contracted and Includes an Inflatable Envelope of Elastic Material and an Elastic Casing of Definite Length and Width, But Variable Depth.** T. Nakagawa, Shimonoseki, Japan; vested in the Alien Property Custodian.

2,345,201. **Vehicle Suspension and Spring.** A. S. Krots, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,345,220. **Pump Having a Body Tapered downwardly to Fit in a Bottle Neck.** T. H. Sarchet, Spokane, Wash.

2,345,421. **Tufted Pneumatic Mattress of Vulcanized Rubber.** G. H. Perry, Brooklyn, N. Y., assignor to Airtress Corp. of America, a corporation of N. Y.

2,345,515. **For Sealing a Circular Crack between Two Members Confining a Fluid Such as Oil, a Sealing Ring Including a Body of Synthetic Rubber Subject to Growth When in Contact with Oil.** R. L. Tweedale, assignor to Vickers, Inc., both of Detroit, Mich.

Dominion of Canada

418,806. **Surgical Device Adapted to Apply Pressure to a Part of the Human Body, Consisting of a Ring Having a Rubber Core and a Relatively Thick Sheath Formed of Strips of an Adhesive and Elastic Material Wrapped around the Core.** W. B. Erekson, Sandy, Utah, U. S. A.

418,819. **In Combination with a Vehicle Wheel, a Safety Tire.** J. V. Martin, Washington, D. C., U. S. A.

418,825. **Thermoplastic Adhesive Strip as Seal for a Package.** L. L. Salfisberg, South Orange, N. J., U. S. A.

418,637. **For Dispensing Sterile Intravenous Solutions, a Container Having Transparent Flexible Walls.** American Hospital Supply Corp., Chicago, assignee of F. G. McGaw, Evanston, both in Ill., U. S. A.

418,867. **In a Conveyer, a Container of Rubber or Rubberized Fabric.** Chemical Construction Corp., New York, N. Y., assignee of C. M. Hulings, Westfield, N. J., both in the U. S. A.

418,906. **Electric Power Cable Having an Insulating Layer of Rubber Vulcanized to the Outer Surface of the Conductor.** Northern Electric Co., Ltd., Montreal, P. Q., assignee of T. R. Scott, London, England.

418,909. **Conductive Overshoe to Wear over Ordinary Non-Conductive Shoe.** O'Donnell Shoe Co., assignee of L. J. Monahan, both of Humboldt, Tenn., U. S. A.

418,988. **Packing Ring Having an Endless Backing Ring of Relatively Soft Resilient Rubber.** J. H. Onions, London, England.

419,029. **Storage Battery Plate with Top and Bottom Bars, a Group of Separate Pencils of Active Material, Surrounded by a Sleeve of Knitted Fabric, and Strips of Vinyl Resin between the Pencils and on the Confronting Surfaces of the Fabric.** Electric Storage Battery Co., Philadelphia, assignee of C. D. Galloway, Wyndmoor, both in Pa., U. S. A.

419,046. **Soft or Sponge Rubber Pad for the Toe of a Boot or Shoe.** Joykix, Ltd., Reading, Berkshire, assignee of W. E. Harwood, Launceston, Cornwall, both in England.

419,079. **For a Wire Harness Consisting of a Main Bundle of Unconnected, Separately Insulated Individual Wires, One or More of Which Is Separated from the Main Bundle at Intervals to Form an Insulated Leg Wire or Wires, a Wrapping of Stretched Tape over the Main Bundle and the Juncture of the Leg Wires; the Tape Consists of a Plasticized Vinyl Resin, Which Is a Product of the Copolymerization of Vinyl Chloride with Vinyl Acetate.** Union Carbide & Carbon Corp., assignee of Halowax Corp., both of New York, N. Y., assignee of E. R. Hanson, Bloomfield, N. J., both in the U. S. A.

419,087. **Rubber Gas Mask.** United States Rubber Co., New York, N. Y., assignee of M. C. Teague, Ridgwood, N. J., both in the U. S. A.

419,118. **Rubber Piston Packing.** H. R. Nuckles, La Crescenta, Calif., U. S. A.

419,121. **Rubber Tubing to Form Insulation for a Handle for a Vacuum Bottle Cup.** H. A. Rose, Calgary, Alta.

419,194. **In a Laminating Machine, a Relatively Large Rubber-Covered Roller.** International Plastic Corp., assignee of I. Spinner and C. B. Nelson, all of Chicago, Ill., and G. Schieman, Morristown, N. J., both in the U. S. A.

419,206. **Resilient Joint for Two Metal Pipes, Which Includes Rounded Flanges on the Ends of the Pipes, and a Rubber Tube into the Ends of Which the Pipes Are Inserted.** Rolls-Royce, Ltd., assignee of C. L. Cowdrey, both of Derby, England.

United Kingdom

558,396. **Rollers for Washing, Wringing, and Mangling Machines.** R. Parlett.

558,404. **Lifesaving Waistcoats.** Crossland Hughes & Co., Ltd., and E. D. Mackenzie.

558,449. **Fire Hose.** G. Angus & Co., Ltd., E. E. Hardy-Birt.

558,470. **Soft Resilient Linings for Dentures.** R. A. Kinnear, J. W. Davison, and Imperial Chemical Industries, Ltd.

559,505. **Windshield Wipers.** Firestone Tire & Rubber Co.

559,613. **Life-Preserving Suit.** W. J. Pike.

PROCESS

United States

2,343,724. **Retreading Pneumatic Tires.** G. Wheatley, Immlay City, Mich., assignor to General Tire & Rubber Co., Akron, O.

2,344,181. **Resilient and Elastic Tube from Glass Strands.** G. A. Stone, Columbus, O.

2,344,494. **Coating Glass Fiber Thread with Latex.** W. M. Camp, Glen Ridge, N. J., assignor to Clark Thread Co., Newark, N. J.

2,344,511. **Treating a Formed Article of a Crystalline Vinylidene Chloride Polymer.** E. H. Harder, assignor to Dow Chemical Co., both of Midland, Mich.

2,344,575. **Molding Strips.** H. B. Warren, Cincinnati, O.

2,344,638. **Game Balls.** L. E. Reeder, assignor to Sport Products, Inc., both of Cincinnati, O.

2,345,200. **Full-Molded Puncture-Sealing Inner Tubes for Pneumatic Tires.** A. N. Iknayan, Indianapolis, Ind., assignor to United States Rubber Co., New York, N. Y.

2,345,376. **Flocked Floor Coverings.** V. H. Bodle and G. W. Blair, assignors to Mishawaka Rubber & Woolen Mfg. Co., all of Mishawaka, Ind.

2,345,447. **Making Printing Plates Employing Polyvinyl Alcohol and Clay and Polyvinyl and Calcium Carbonate.** E. Bassist, Brookline, Mass., assignor to W. C. Toland, Brookline, Mass.

2,345,518. **Preparing a Tread Band for Retreading Tire Carcasses.** D. Wendel, Johnstown, Pa., assignor to Webster Rubber Co., Warren, O.

Dominion of Canada

419,102. **Waterproof Sole.** R. and J. Pickles, both of Burnley, Lancaster, England.

United Kingdom

558,313. **Securing Metallic Skins to Aircraft Structures.** United States Rubber Co.

558,531. **Solid Rubber Wheels and Rollers.** S. B. Woolf.

559,209. **Covering Electrical Conductors with Insulation.** Standard Telephones & Cables, Ltd.

559,235. **Articles from Paper or Cloth Fabric, Yarn, Fiber, Asbestos, Etc., Bonded or Impregnated with Resinous Substances.** Brown & Adam, Ltd., A. S. Brown, and Imperial Chemical Industries, Ltd.

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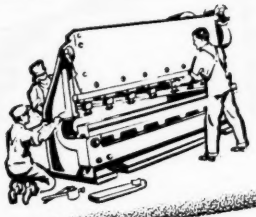
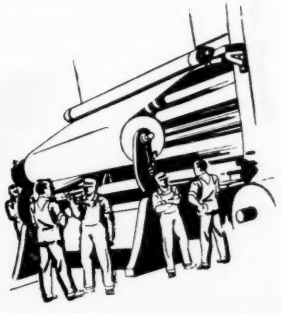


Every breakdown of equipment wastes productive time. Sun's SAVE and SERVE Plan helps you cut down these wasteful periods — when valuable machinery must stand idle unnecessarily — and increases the actual productive time you can expect from your equipment.

③ SAVES LABOR



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CHEMICAL

United States

2,343,095. **As Finishing Composition for Textile Fibers, a Highly Dispersed Polymerized Vinyl Compound from a Dilute Aqueous Suspension of the Same; the Compound being Rendered Substantive to the Fiber by Being Dispersed in Aqueous Medium with a Cationic Surface Active Agent Prior to Dilution in the Treating Bath.** J. E. Smith, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,343,111. **Producing the Sodium Hydroxylate of an Aryl Aldehyde by Reacting an Hydroxy Aryl Amine with Sodium Hydroxide.** A. F. Hardman, assignor to Wingfoot Corp., both of Akron, O.

2,343,162. **Aryl Sulphoxides.** J. Vonkennel and J. Kimmig, both of Kiel, Germany, assignors to Schering Corp., Bloomfield, N. J.

2,343,186. **Liquid Composition to Be Added to a Material to Impart Fire-Resistance and Plasticity.** H. Hopkinson, Watertown, Mass.

2,343,213. **Preparing the Barium Salt of Esters of Dithiophosphoric Acid.** K. D. Ashley, Noroton, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,343,215. **Producing Fusible, Resin-Like Substances from Plant Bodies Initially Containing Cellulose from Which Pentosan Has Been Removed, Reacted with at Least One Material Selected from the Group of Resin Acids of the Kind Found in Tall Oil, and Mixtures of Such Acids and the Fatty Acids of the Kind Found in Tall Oil.** E. Farber, assignor to Polyxor Chemical Co., Inc., both of New Haven, Conn.

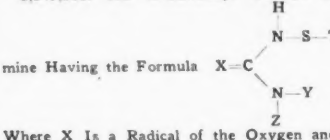
2,343,230. **Preparing Alkylated Melamine Formaldehyde Condensation Products.** R. C. Swain, Riverside, and P. Adams, Stamford, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,343,368. **Gasket Material of a Synthetic Compound of Lignin and Rubber-Like Polymerized Chloroprene, and Filler.** L. G. Daly, Port Clinton, O.

2,343,483. **Production of Interpolymers of (A) a Fatty Oil Having Drying Properties and a Degree of Conjugation not above That of Dehydrated Castor Oil with a Diester of Maleic Acid and an Alcohol of the Group of Allyl and Methallyl Alcohol; and (B) Material of the Class of Styrene and Vinyl Esters of the Saturated Lower Fatty Acids.** B. E. Sorenson, Upper Darby, Pa., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,343,536. **Purification of Maleic Anhydride.** J. H. Crowell, Orchard Park, assignor to Allied Chemical & Dye Corp., both of N. Y.

2,343,538. **An N-Carbamyl Thiazyl Sulphamine Having the Formula**



Where X Is a Radical of the Oxygen and Sulphur Group; T a 1-thiazyl radical; Y and Z Radicals of the Group of Hydrogen, Alkyl, Alkenyl, Aralkyl, Aryl and Alkylene Radicals of a Heterocylic Group with the N. W. H. Ebelke, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

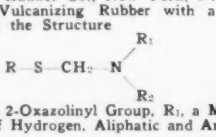
2,343,541. **Reducing Local Coagulation of an Alkaline Latex on Addition of an Alkali Metal Fluosilicate by Employing the Latter Suspended in an Aqueous Medium Containing Enough Alkali Metal Fluoride to Repress the Hydrolysis of the Fluosilicate Ion.** B. H. Ewart, Nutley, N. J., assignor to United States Rubber Co., New York, N. Y.

2,343,551. **Adhesive Composition Consisting of Rubber, a Soluble Reactive Phenol-Aldehyde Resin, and Lead Chromate in an Organic Solvent.** H. H. Harkins, Providence, R. I., assignor by mesne assignments to United States Rubber Co., New York, N. Y.

2,343,558. **Reclaiming Waste Vulcanized Polychloroprene by Heating at Temperatures Ranging from 300° to 420° F. in the Presence of an Acid of the Formula R—COOH, Where R Is of the Group of H, OH, COOH, and Aliphatic Hydrocarbon Groups Containing from One to 18 Carbon Atoms.** W. G. Kirby and P. M. Elliott, both of Naugatuck, Conn., assignors to United States Rubber Co., New York, N. Y.

2,343,559. **Reclaiming Waste Vulcanized Polychloroprene while in a Subdivided Condition at a Temperature from 300° to 420° F. in the Presence of a Sugar.** W. G. Kirby and L. E. Steinle, both of Naugatuck, Conn., assignors to United States Rubber Co., New York, N. Y.

2,343,566. **Vulcanizing Rubber with a Compound Having the Structure**



Where R Is a 2-Oxazolinyl Group, R_1, a Member of the Class of Hydrogen, Aliphatic and Aromatic Groups, and R_2 of the Class of Aliphatic and Aromatic Groups. R. A. Mathes, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,343,712. **Conjugated Diolefins.** R. F. Ruthsuff, Chicago, Ill.

2,343,768. **Preparation of Quinones.** C. F. Gibbs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,343,769. **4-Aminostearic Acid.** H. W. Gray, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,343,808. **Nitrogenous Linear Condensation Products Obtained by Subjecting to Condensation Conditions a Diurethane with a Bifunctional Compound of the Formula**

HK—(CH_2)x—NH—Y—NH—(CH_2)x—XH

in Which X Is of the Group of O and S, x Is at least 2, and Y Is a Bivalent Radical of the Group of —CO—CO— and —CO—R—CO—, Where R Is a Bivalent Hydrocarbon Radical. P. Schlack, Berlin-Treptow, Germany; vested in the Alien Property Custodian.

2,343,816. **Isolating and Recovering Pure Isobutylene Polymers of High Molecular Weight from a Vulcanized Composition of the Polymers and Natural Rubber.** W. J. Sparks, Alexandria, Va., E. L. Baldeschwieler, Cranford, and J. V. Sommer, Elizabeth, both in N. J., assignors by mesne assignments to Jasco, Inc., a corporation of La.

2,343,830. **Preparing Pentadienes by Pyrolizing a Material Made up of at least One Pentene and Containing only Pentenes at a Temperature between 900° and 1100° C. and under Pressure of about 10 to 60 Mm./Hg., in the Absence of a Catalyst, until Substantially All of the Pentene Material Has Been Converted to Other Substances, and Then Distilling to Separate the Pentadiene.** J. G. Lichty, Stow, O., assignor to Wingfoot Corp., Akron, O.

2,343,834. **Rubber Hydrochloride Containing a Photochemical Inhibitor, Which Is a Reaction Product of an Alkylene Polyhalide and a Primary Aliphatic Amine; the product Has a Higher Boiling Point Than Any Alkylene Polyamine and Any N-Aliphatic Piperazine Formed from the Same Starting Materials.** W. Scott, Akron, O., assignor to Wingfoot Corp., Wilmington, Del.

2,343,835. **Compounding Rubber with Hard, Difficultly Dispersible Aggregates of a Di(Arylenethiazyl) Disulphide.** C. H. Smith, Talmadge, and A. J. Gracia, Cuyahoga Falls, assignors to Wingfoot Corp., Akron, all in O.

2,343,845. **Preparing a Synthetic Resin by Reacting a Terpene and a Phenol in the Presence of a Molecular Compound of Boron Trifluoride.** P. O. Powers, Mannheim Township, assignor to Armstrong Cork Co., Lancaster, both in Pa.

Dominion of Canada

418,285. **Thermoplastic Molding Composition Essentially Consisting of a Slightly Hydrolized Organic Acid Ester of Cellulose Containing 30-55% of Butyryl, and 5-30% (Based on the Weight of the Cellulose) of a Stable, High-Boiling, Low Vapor Pressure Moisture-Resistant Plasticizer Mixture.** Canadian Kodak Co., Ltd., Toronto, Ont., assignee of F. R. Conklin, Kingsport, Tenn., and C. J. Malm, Rochester, N. Y., both in the U. S. A.

418,321. **Improving the Molding Properties, Appearance, and Mechanical Strength of the Resinous Products of the Reaction of Sulphur Dioxide with Olefinic Bodies.** Phillips Petroleum Co., assignee of F. E. Frey, both of Bartlesville, Okla., and P. A. Bury, Cincinnati, both in the U. S. A.

418,509. **Preparing a Light-Colored, Oil-Soluble Resinous Composition by Reacting Unsymmetrical Para Phenol-Phenyl Ethane and Formaldehyde.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

418,515. **Process for Preparing a Polymer of a Compound of the Class Consisting of Alpha-Chloro-Acrylic Acid and Esters thereof.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. W. C. Crawford, Frodsham, and N. McLeish, Runcorn, co-inventors, both in Cheshire, England.

418,517. **Highly Adhesive and Scratch-Resistant Coating Composition of Polyvinyl Butyraldehyde Resin, Cellulose Nitrate, and Shellac.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. L. Overholt, New Brunswick, N. J., U. S. A.

418,519. **Finishing Composition for Surfaces, Made of Plasticizer, the Resinous Reaction Product of Urea, Formaldehyde, and Monohydric Alcohol and the Resinous Reaction Product of a Maleic Compound Glycerol, and a Modifying Ingredient.** Canadian Industries, Ltd., Montreal, P. Q., assignee of E. F. Oeffinger, Milltown, N. J., and H. G. Stauffer, Drexel Hill, Pa., both in the U. S. A.

418,563. **Vinyl Resin Coating Composition.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of A. K. Doolittle, South Charleston, W. Va., U. S. A.

418,569. **Polymerization of a Mixture of Styrene and a 2-Chloroallyl Ester Containing at Least Two Ethylenic Linkages.** Dow Chemical Co., assignee of E. C. Britton, G. H. Coleman, and J. W. Zemba, all of Midland, Mich., U. S. A.

418,590. **Fusible Polymer of an Unsaturated Ester of an Alpha Substituted Acrylic Acid.** Pittsburgh Plate Glass Co., Pittsburgh, Pa., and M. A. Pollack, Akron, O., both in the U. S. A.

418,591. **Copolymer of an Ester of Alpha-Chloracrylic Acid and a Polymerizable Compound of the Group Consisting of Alpha-Chloracrylic Acid, Acrylic Acid; Methacrylic Acid, Esters, Amides and Nitriles of Acrylic and Methacrylic Acid, Styrene, Butadiene, β-chlorobutadiene, Vinyl Chloride and Esters of Vinyl Alcohol.** Pittsburgh Plate Glass Co., Pittsburgh, Pa., assignee of M. A. Pollack, Akron, O., U. S. A.

418,691. **Treating Fluids to Remove Particular Constituents by Subjecting the Fluid to the Action of a Water-Insoluble Resin Prepared by Reacting One to Two Molar Proportions of Formaldehyde with One Molar Proportion of a Monohydric-Phenol Sulphonic Acid in the Absence of a Polyhydric Phenol.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of D. M. Findlay, Omaha, Neb., U. S. A.

418,746. **Powdered Thermoplastics.** Shawinigan Chemicals, Ltd., Montreal, assignee of E. P. Irany, Shawinigan Falls, both in P. Q.

418,762-418,764. **Process for Polymerizing a Light Oil Fraction in Which the Principal Constituent Is an Aromatic Olefin Containing the Styrene Structure as a Nucleus.** United Gas Improvement Co., Philadelphia, assignee of F. J. Soday, Swarthmore, both in Pa., U. S. A.

418,780. **Composition Containing a Resinous Reaction Product of a Glycerine Oil Component and an Oxide Selected from the Group Consisting of the Alkaline Earth Metal and Magnesium Oxides and a Hydrocarbonaceous Component.** R. R. Grant, Los Angeles, Calif., inventor, M. Isaacson, Dayton, O., and S. Shappiro, Washington, D. C., all in the U. S. A., each an assignee of one-fourth of the interest.

418,851. **Colored Titanium Pigments.** Canadian Industries, Ltd., Montreal, P. Q., assignee of H. H. Schaumann, Roselle, Del., U. S. A.

418,852. **White Titanium Dioxide Pigments.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. E. Booge, Wilmington, Del., U. S. A.

418,853. **Purifying Titanium Oxide Pigments.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. K. Whitten, Wilmington, Del., U. S. A.

418,854. **Rutile Titanium Oxide Pigments.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. M. McKinney and H. M. Stark, both of Wilmington, Del., U. S. A.

418,855. **Improved Colored Titanium Pigment with Color Range from Light Yellow to Dark Buff.** Canadian Industries, Ltd., Montreal, P. Q., assignee of H. H. Schaumann, Wilmington, Del., U. S. A.

418,856. **Improved Rutile Titanium Oxide Pigment.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. H. Peterson, Wilmington, Del., U. S. A.

418,858. **Rutile Titanium Dioxide Pigment.** Canadian Titanium Pigments, Ltd., Montreal, P. Q., assignee of National Lead Co., New York, N. Y., assignee of S. S. Cole and W. K. Nelson, both of Metuchen, N. J., both in the U. S. A.

418,859-418,861. **Rutile Titanium Dioxide Pigment.** Canadian Titanium Pigments, Ltd., Montreal, P. Q., assignee of National Lead Co., New York, N. Y., assignee of S. S. Cole, Metuchen, N. J., both in the U. S. A.

418,862. **Titanium Dioxide Pigments.** Canadian Titanium Pigments, Ltd., Montreal, P. Q., assignee of J. Barksdale, New York, N. Y., and W. W. Plechner, Metuchen, N. J., both in the U. S. A.

418,886. **Producing a Resinous Composition by Heating Ligneous Wood and a Resin Acid or Materials Containing Resin Acids with Water under Superatmospheric Pressure at a Temperature Within the Range of 240° to 330° C. until the Cellular Structure of the Wood Has Disappeared, and then Recovering the Resin as a Residue Remaining after Removal of the Water Solution.** Hercules Powder Co., assignee of R. W. Martin, both of Wilmington, Del., U. S. A.

United Kingdom

557,976. **Diphenylolpropane.** Distillers Co., Ltd., H. M. Stanley, J. D. Morgan, and W. L. Pritchard.

557,979 **Purification of Methyl Methacrylate.** E. I. du Pont de Nemours & Co., Inc., and B. M. Marks.

558,011. **Preparation of Copolymers of Cyclic Imides of Olefin Dicarboxylic Acids.** Imperial Chemical Industries, Ltd., (E. I. du Pont de Nemours & Co., Inc.).

558,018. **Sponge Rubber.** United States Rubber Co.

558,058. **Monoazo Dyestuffs.** A. H. Knight, W. E. Stephen, and Imperial Chemical Industries, Ltd.

558,065. **Sponge Rubber.** United States Rubber Co.

558,106. **Polymerization Products.** J. G. M. Bremner, A. W. C. Taylor, D. G. Jones, and Imperial Chemical Industries, Ltd.

558,164. **Plastic Material.** Cotopa, Ltd., and E. Chippindale.

558,225. **Acylation of Sulphonamides.** E. Katschner and Ward, Blenkinsop & Co., Ltd.

558,285. **Titanium Dioxide.** E. I. du Pont de Nemours & Co., Inc., and C. M. Olson.

558,317. **Organic Polymer Emulsion.** E. I. du Pont de Nemours & Co., Inc.

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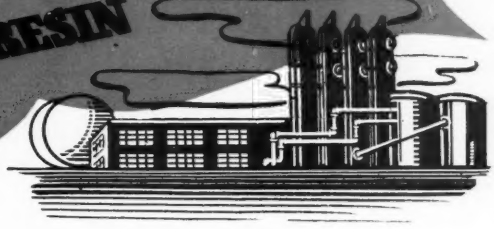

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558,329. **Vulcanization of Rubber.** E. I. du Pont de Nemours & Co., Inc., A. M. Neale, and B. M. Sturgis.
558,334. **Reclaiming Rubber-Like Products.** Wingfoot Corp.
558,745. **Synthetic Resin Adhesives.** G. L. Knott, E. J. G. Bailey and Imperial Chemical Industries, Ltd.
558,798. **Rubber Hydrochloride Film.** Wingfoot Corp.
558,811. **Olefin Polymers.** Standard Oil Development Co.
558,813. **Synthetic Resins.** E. I. du Pont de Nemours & Co., Inc., and H. S. Rothrock.
558,815. **Liquid and Semi-Liquid Compositions Capable of Setting to Elastoplastic Condition.** Parker Moir & Co., Ltd., and L. Levinovitsch.
558,816. **Electrical Insulating Compositions.** British Thomson-Houston Co., Ltd., and R. Newbound.
558,887. **O-Aminothiophenol or Its Alkali Metal Salts.** J. A. Gardner and Monsanto Chemicals, Ltd.
558,888. **Halogenation of Unsaturated Organic Compounds.** Shell Development Co.
558,912. **Sulphonated and Phosphated Oils and Products Prepared Therefrom.** G. W. Fiero.
559,020. **Polystyrene Molding Composition.** Bakelite, Ltd.
559,028. **Curable Thermoplastic Material.** W. Engel.
559,043. **Polyvinyl Resin Compositions.** Carbide & Carbon Chemicals Corp.
559,053. **Alkylation Process.** Shell Development Co.
559,054. **Resilient Product Adapted to Serve as a Substitute for Rubber.** H. G. W. Chichester-Miles, and W. O. Street.
559,080. **Halogenation of Unsaturated Aliphatic or Alicyclic Compounds.** Shell Development Co.
559,206. **Condensation of Aldehydes with Ketones.** H. Dreyfus and J. G. N. Drewitt.
559,207. **Alkyl Derivatives of Paraffinic Hydrocarbons.** Universal Oil Products Co.
559,208. **Vulcanized Products of Comminuted Solid Material and Rubber.** United States Rubber Co.
559,294. **Chlorination of Polymerized Olefins.** Standard Oil Development Co.
559,306. **Phenyl and Phenylethylmalonic Esters.** P. Gaubert, F. R. Smith, and Imperial Chemical Industries, Ltd.
559,500. **Sponge Rubber from Aqueous Dispersions of Rubber.** United States Rubber Co.
559,514. **Synthetic Linear Polyamide Compositions.** E. I. du Pont de Nemours & Co., Inc., and F. T. Peters.
559,516. **New Hydrazine Derivatives Containing Hydroxyalkyl Groups.** Society of Chemical Industry in Basle.
559,520. **Moistureproof Sheet or Film.** British Cellophane, Ltd.
559,525. **Compound Sheet Material.** United States Rubber Co.
559,590. **Synthetic Resin Adhesives.** Jicwood, Ltd., and R. L. J. Farina.
559,617. **Recovery of Olefin Oxides.** U. S Industrial Alcohol Co.

MACHINERY

United States

2,343,529. **Extruder.** F. E. Brown, Hyde, England.
2,343,641. **Vulcanizer Press for Pneumatic Tires.** J. W. Brundage, assignor by mesne assignments to McNeil Machine & Engineering Co., both of Akron, O.
2,343,893. **Vulcanizer for Rubber-Covered Wire, Etc.** A. W. Ferre, Wellesley, and C. E. Blanchard, Randolph, assignors to B. F. Sturtevant Co., Boston, all in Mass.
2,343,954. **Tire Building Drum and Means for Feeding Tire Fabric Strips.** J. C. Carlin, Norristown, Pa., assignor to Lee Rubber & Tire Corp., Conshohocken, Pa.
2,343,975. **Apparatus and Process for Uniting Sheets of Thermoplastic Material.** L. C. Hosfield, Parma, O., assignor to National Carbon Co., Inc., a corporation of N. Y.
2,344,158. **Apparatus for Treating Oversize, Low-Pressure Tires During Repair Activities.** W. V. Maze, assignor to C. E. Miller Mfg. Corp., both of Anderson, Ind.
2,344,176. **Machine and Method for Molding Plastics.** F. H. Shaw, South Orange, N. J., assignor to Shaw Insulator Co., Irvington, N. J.
2,344,959. **A Die for Extruding Pipe from Plastic Material.** S. B. Avery, Philadelphia, Pa., assignor to Ruberoid Co., New York, N. Y.
2,345,172. **Tire Retreader.** T. P. Bacon, Oakland, Calif.
2,345,195. **Apparatus for Cutting Sheet Material and Making Laminated Units Thereof.** U. C. Haran, Akron, and J. P. Sapp, Kent, both in Ohio, assignors to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

418,077. **Repair Valve for Multi-Chambered Safety Tube.** Wingfoot Corp., Wilmington, Del., assignee of B. C. Eberhard, Akron, Ohio, U. S. A.
418,670. **Vulcanizing Press.** Akron Standard Mold Co., assignee of H. C. Bostwick, both of Akron, O., U. S. A.
418,679. **Tread Link Rubber Stripper.** Burgess-Norton Mfg. Co., Geneva, assignee of C. O. Dohrenwend, Blue Island, both in Illinois, U. S. A.
418,772. **Tire Band Building Apparatus.** Wingfoot Corp., Akron, assignee of H. H. Clark, Cuyahoga Falls, both in O., U. S. A.
418,925. **Means for Removing Tires from Vulcanizing Molds.** Super Mold Corp. of California, assignee of E. A. Glynn, both of Lodi, Calif., U. S. A.

United Kingdom

557,995. **Apparatus for Controlling the Flow of Air to and from an Inflatable Element for Ice Elimination on Surfaces of Aircraft.** B. F. Goodrich Co. and H. G. Cruikshank.
558,131. **Machine to Form Hollow Plastic Bodies.** G. R. Kelm.
558,256. **Apparatus and Method for Making Driving Belts, Etc.** Wingfoot Corp.
558,261. **Means for Impregnating Fabrics with Liquids.** Texproof, Ltd., and R. H. Czechowitzka.
558,908. **Apparatus for Building Endless Flexible Bands.** Wingfoot Corp.
559,153. **Extruders.** Henley's Telegraph Works Co., Ltd., and W. T. and F. T. Griffiths.

UNCLASSIFIED

United States

2,343,251. **Non-Skid Two-Piece Metal Jacket for Tires.** L. A. Beard, Silsbee, Tex.
2,343,366. **Tire Locking Device.** O. Brummer, Oak Park, assignor of one-half to J. E. Barss, Riverside, both in Ill.
2,343,498. **Protective Device for Tires.** T. A. Dunagan, Montrose, Calif.
2,343,512. **Icebag Closure.** F. Lobl, Middleboro, Mass.
2,343,582. **Tire Gage.** C. G. Rist, assignor of one-half to R. T. Rist, both of St. Paul, Minn.
2,343,838. **Filling a Straight-Side, Inextensible Tire with Water.** M. A. Wilson, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.
2,344,038. **Wheel and Tire Lock.** C. D. Griffiths, Long Beach, Calif.
2,344,256. **Tire Inflater.** La V. D. Lyon, Goshen, and J. J. Rothwell, Elkhart, assignors to Penn Electric Switch Co., Goshen, all in Ind.
2,344,970. **Tire Anti-Skid Device.** N. H. Copp, assignor of one-half to H. J. Nagle and one-half to R. A. Nagle, all of Rochester, N. Y.
2,345,346. **Tire Removing Device.** L. Larson, assignor to Gateway City Transfer Co., Inc., both of La Crosse, Wis.

Dominion of Canada

418,368. **Tire Remover.** T. R. Belsheim, Vancouver, B. C.
418,429. **Conveying System.** Lee Rubber & Tire Corp., Conshohocken, assignee of F. Leopold, Harmonville, both in Pa., U. S. A.
419,489. **Hose Coupling.** F. E. Smith, Chelsfield, Kent, England.
418,657. **Vehicle Wheel.** G. A. Lyon, Allenhurst, N. J., U. S. A.
418,658. **Wheel Structure.** G. A. Lyon, Allenhurst, N. J., U. S. A.
418,771. **Valve for Tractor Tires, Etc.** Wingfoot Corp., assignee of B. C. Eberhard, both of Akron, O., U. S. A.
418,979. **Tool for Applying Tire Chains.** E. L. Kibler, Pittsburgh, Pa., U. S. A.
419,047. **Vehicle Wheel.** Kelsey-Hayes Wheel Co., assignee of C. W. Sinclair, both of Detroit, Mich., U. S. A.

United Kingdom

558,371. **Locking Device for Cycle Tire Inflators.** H. W. Wedlake and F. Hogg.
558,397. **Wheels for Land and Road Vehicles.** W. Savage and Ruston-Bucyrus, Ltd.
558,420. **Valve for Plural Chamber Safety Tube.** Wingfoot Corp.
558,932. **Inflater Valve.** North British Rubber Co., Ltd., and R. J. Aspey.
559,023. **Vehicle Wheels.** Dunlop Rubber Co., Ltd., F. G. W. King, and R. F. Daw.
559,577. **Apparatus to Detect Faults in Tires and Road Wheels.** J. B. Crosby.

TRADE MARKS

United States

406,011. **Glu-Weld.** Waterproof pastes, glues, and adhesive gums. F. G. Findley Co., Milwaukee, Wis.
406,014. **Flexatex.** Hose pipe. Wilkinson Rubber Linatex, Ltd., London, England.
406,036. **Saranfilm.** Films, foil, or sheets of copolymers of vinylidene chloride, with or without plasticizers for use as wrapping and packaging material. Dow Chemical Co., Midland, Mich.
406,066. **Salfasan.** Compounds used in curing natural and synthetic rubber articles. Monsanto Chemical Co., St. Louis, Mo.
406,142. **Sun Chasers.** Wearing apparel, including play shoes, corsets, brassieres. Rainbow Shops, Inc., Brooklyn, N. Y.
406,196. **Syntex.** Pencils and erasers. Eberhard Faber Pencil Co., Brooklyn, N. Y.
406,199. **Plexiglas.** Synthetic resin molding powders. Rohm & Haas Co., Philadelphia, Pa.
406,210. Circular arrangement of letters to form the word: "Sepco." Ear plugs. Safety Ear Protector Co., Los Angeles, Calif.
406,227. **T G.** Transmission belts. Gates Rubber Co., Denver, Colo.
406,369. **The Statesman De Luxe.** Tires. Richmond Rubber Co., Inc., Richmond, Va.

Rims Approved and Branded by the Tire & Rim Assn., Inc.

Rim Size	Mar., 1944
15" & 16" D. C. Passenger	
16x4.00E	117,051
16x4.25E	17,322
16x4.50E	62,067
15x5.00E	7,246
16x5.00E	3,743
16x5.00F	7,738
15x5.50F	2,803
16x5.50F	3,752
16x6.00F	2,251
16x6L	369
17" & Over Passenger	
18x2.15B	1,192
Flat Base Truck	
20x3.75P (5")	586
17x4.33R (6")	4,334
18x4.33R (6")	806
20x4.33R (6")	15,301
15x5.00S (7")	14,073
18x5.00S (7")	246
20x5.00S (7")	280,196
24x5.00S (7")	555
15x6.00T (8")	10,830
20x6.00T (8")	76,569
22x6.00T (8")	18,560
24x6.00T (8")	979
15x7.33V (9-10")	322
20x7.33V (9-10")	53,186
22x7.33V (9-10")	6,563
24x7.33V (9-10")	10,239
20x8.37V (11")	638
Semi D. C. Truck	
16x4.50E	5,815
16x5.50F	6,137
Tractor & Implement	
12x2.50C	793
15x3.00D	15,652
16x3.00D	2,477
18x3.00D	514
19x3.00D	10,678
20x4.50E	1,033
18x5.50F	409
20x5.50F	1,437
24x5.50R	149
36x5.50R	220
24x6.00S	422
36x6.00S	657
24x8.00T	6,884
28x8.00T	1,599
32x8.00T	207
36x8.00T	2,665
W8-24	15,477
W8-28	1,584
W9-38	16,618
W10-26	654
W10-38	1,790
DW8-38	4,250
DW9-28	1,827
DW9-38	13,520
DW10-38	20,779
DW11-24	1,473
DW11-26	678
DW11-30	232
DW11-36	465
DW11-38	2,691
DW12-26	896
Cast	
24x15.00	120
TOTAL	861,719

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A NEW buoyancy-type instrument which both controls and indicates liquid level and which employs a measuring device called a Level-Buoy and the Taylor Fulscope Control mechanism with either completely adjustable sensitivity for smooth throttling level control, or automatic reset for averaging of liquid level with a minimum of disturbance to the process has been announced. A torque tube transmits the level changes to the instrument mechanism. This eliminates a stuffing box with its need of lubrication or packing and gives a closed system which eliminates leakage. The torque tube is interchangeable with the ones used in the Taylor Aneroid Manometer, which is an advantage to instrument users in minimizing inventories of spare parts. There are no internal pivots to cause friction or wear. The Level-Buoy handles liquids with specific gravities between 0.20 and 2.0. It is available in the following standard ranges: 14-, 32-, 60-, 72- and 120-inch. Taylor Instrument Cos., Rochester 1, N. Y.

Refractometer for Butadiene Analysis

ENGAGED in the continuous production of butadiene and requiring an instrument capable of indicating the purity of the products as they flowed through a processing pipeline, the Shell Development Co., Emeryville, Calif., developed the continuous flow pressure-type refractometer, in which readings are taken at the pressure at which butadiene is produced. The liberal policy of the Shell company, coupled with the collaboration of its technical staff, has enabled Precision Scientific Co. to manufacture and market this instrument. Utilizing the original design, certain structural modifications and refinements dictated by a knowledge of the widely divergent conditions under which an instrument of this type may be put to use, have been incorporated by the Precision company's technical staff.

The instrument consists of a refractometer, with a dipping prism mounted in a pressure cell through which the liquid, whose index of refraction is to be measured, flows continuously under pressure existing in the process flow-line, while being maintained at constant temperature. Both pressure and temperature maintained within the instrument are adjustable to meet individual installation requirements and applications to various liquids.

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LATIN AMERICA

ARGENTINA

Argentina is one of the South American countries which does not grow its own rubber; but until the seizure of the rubber-growing territories in the Far East by the Japanese, Argentina obtained necessary supplies from neighboring republics. However this source has practically been closed to her following the arrangements whereby producer countries reserve all rubber in excess of domestic requirements for the use of the United Nations. As a result, Argentina in having difficulty in supplying her growing rubber manufacturing industry, a situation which has encouraged smuggling of rubber from Brazil and other nearby countries. The press announces that this traffic is assuming notable, not to say alarming, proportions.

The Argentine Government itself is tackling the problem of rubber supply in its own way—it has included in its program for industrial expansion plans for the manufacture of rubber. According to a report from Washington, certain companies, which are at least partly government controlled, have already been formed to produce the synthetic material.

According to a recent broadcast, the Ministry of Agriculture warned the people of the Argentine that its rubber shortage was grave. Rubber rationing began in 1942 when rubber imports had fallen to 5,200 tons, which was about half what they had been in 1941. At present the only source of crude rubber available to Argentina is the 180 tons a year which Bolivia supplies.

COSTA RICA

About 400 rubber workers are at present employed in the San Juan River Valley, the most important rubber area of Costa Rica, it is reliably reported. In addition 100 persons are working in the old line area about the northwestern extension of the railroad. To meet the needs of the growing industry, a warehouse and a rubber washing mill are being set up in the city of Limon.

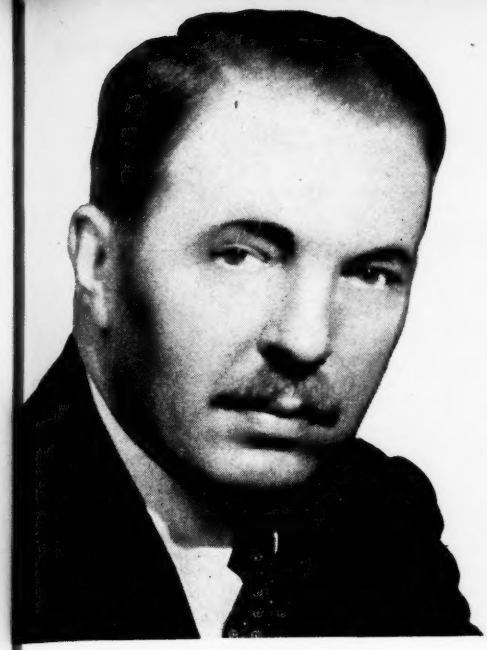
A convention to make the newly established Inter-American Institute of Agricultural Science in Costa Rica a permanent organization has so far been signed by ten American republics: the United States, Costa Rica, Nicaragua, Panama, Cuba, Ecuador, the Dominican Republic, Honduras, El Salvador and Guatemala. The Institute is devoted to research work aimed at improving quinine, rubber, fibers, tropical fruit, and vegetables.

A note in a recent issue of *Agriculture in the Americas*, published by the United States Department of Agriculture, reveals that intensive study of rubber plants at the Institute's field station at Turrialba, by Arnold White and E. P. Imle, Agricultural Research Administration Specialists, has led to the discovery of methods to increase efficiency in budgrafting *Hevea* by 50%. These specialists found that the young *Hevea* tree grows by fits and by starts and that budwood cut at the end of the rest periods gives a 50% advantage over that taken in the active period if there were any delay between cutting and use, such as shipping from one locality to another; they further noticed that the percentage of budding successes is greatly increased by girdling the young *Hevea* plant 9 to 14 days before cutting the budwood.

BRAZIL

Brazilian sources state that the value of tire exports during the first half of 1943 jumped to 101,734,000 cruzeiros from 2,025,000 cruzeiros, in the first half of 1942, indicating a stupendous increase even if a sharp rise in the prices of tires and tubes is taken into account.

To help bring the crude rubber from the interior to the consumer, the Brazilian Government is said to have begun the manufacture at Para of small ships of 80 to 100 horsepower. These vessels carry up to 20 tons of rubber and at the same time draw barges loaded with rubber.



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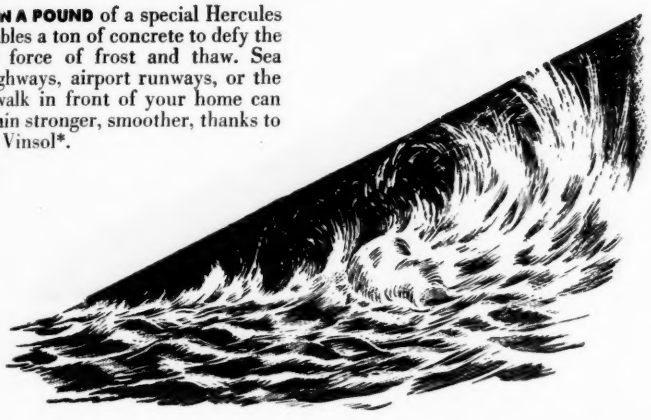
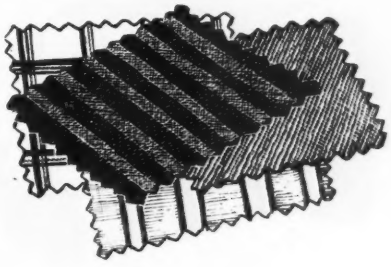
DAVID DIETZ, *Science Editor of the Scripps-Howard Newspapers, Author, and Pulitzer Prize Winner*

LESS THAN A POUND of a special Hercules resin enables a ton of concrete to defy the powerful force of frost and thaw. Sea walls, highways, airport runways, or the cement walk in front of your home can now remain stronger, smoother, thanks to Hercules Vinsol*.

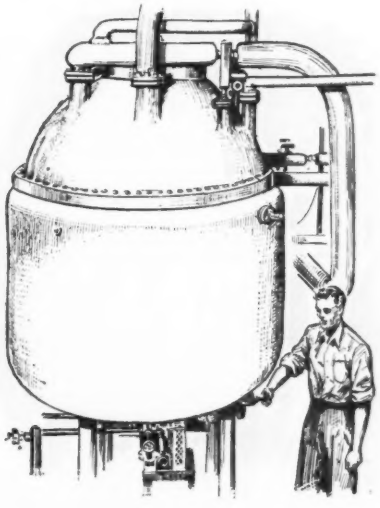




SAVING TIME AND MANPOWER for the textile industry at virtually every processing step is Hercules Yarmor* 302-W Pine Oil. In one large textile mill alone, this specially designed product cut a four-hour operation to two hours and with a cash saving!

CONSERVING CRITICAL MATERIALS is but one important contribution of Hercules Poly-pale* resin to varnish resin producers. This polymerized rosin is permitting savings of glycerin and other scarce materials as high as 30% without sacrificing quality.

LONGER LIFE FOR ADHESIVES is but one of scores of product advantages gained with Hercules Staybelite*, another resin chemical. Its ability to retain a tacky nature indefinitely is important to modern surgical and industrial tapes, masking compositions, and many other adhesives.



HERCULES

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Peace-time engineers of soft-rubber plugs and connectors, sold exclusively thru U. S. RUBBER COMPANY
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PERU

Peru has been expanding rubber operations also and expects to produce 2,000 tons this year—or almost twice last year's output. Francis Truslow Adams, chief of the United States Mission sent to Peru by the Rubber Development Corp., reported recently on his return to Washington. At the same time Peru reduced her own consumption of natural rubber from 1,300 tons in 1941 to 685 tons last year, thanks to government restrictions on the use of tires, inner tubes, and other rubber articles.

Peru has just opened a tire factory said to have an annual capacity of about 27,000 tires and the same number of tubes, in addition to facilities for recapping 10,000 tires. It should be added, however, that it is not expected to reach capacity in 1944. Locally grown rubber is being used, although other kinds of rubber will also be considered. Hitherto Peru imported the bulk of her tires and tubes from Brazil, and most likely will continue to buy a large part of these requirements from Brazil, at least for the present.

The tire situation has evidently improved markedly in Peru, for an order which required that motor-vehicle owners and operators must surrender old tires when buying new ones, has been repealed.

Available data from Brazil indicate that rubber goods stood second on the list of that country's exports of manufactured goods to Peru in 1942. The total value of all manufactured wares was 33,585,000 cruzeiros[1]; textile goods accounted for about 12,500,000 cruzeiros, and articles of rubber for 10,548,000 cruzeiros. The rubber goods included belting, rubberized fabrics and various kinds of articles, but tires and tubes predominated, representing a value of 10,012,000 cruzeiros.

Data for 1943 are not yet complete, but total values of exports of manufactured wares up to August of last year, indicate that shipments of goods from Brazil to Peru for the entire year must have reached record figures, and there is no reason to believe that exports of rubber goods did not share, at least to some extent, in the general upswing.

[1] Value equaled $0.0606 in United States money in Oct., 1943.

ECUADOR

The Hacienda Pichilingue, a 40,000-acre estate in Ecuador, was acquired in 1942 by the Ecuadorean Development Corp., and under a three-way agreement with this corporation, the Government of Ecuador, and the United States Department of Agriculture, an agricultural experiment station is being established to develop various strategic crops, including rubber. Pichilingue is one of four such stations located in South and Central America, the others are in Peru, Nicaragua, and El Salvador. The Hacienda, about 100 miles toward the northeast of Guayaquil, Ecuador's principal inland port, is divided into several sub-divisions. On one the land has already been cleared for a rubber nursery which eventually will supply up-to-date rubber material.

In the neighborhood of the estate are numbers of wild rubber trees worked by former rubber gatherers who bring latex as well as prepared rubber to the estate. To treat the latex, a small coagulation plant was established on the estate, but after the rubber on the areas within easy reach had become exhausted, transportation difficulties made it necessary to build a second coagulation plant on a different part of the estate, for under existing circumstances it was found more expedient to move the coagulating facilities nearer to the latex areas than to try to move the latex to the older plant.

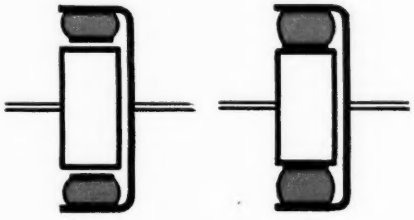
MEXICO

Another stage has been passed in Mexico's rubber development program which is eventually to give the country a rubber plantation industry capable of supplying 80% of its crude rubber needs. *Hevea* seedlings grown in the nursery of the El Palmar Agricultural Experiment Station in the State of Veracruz are now ready for transplanting to fields, and it is hoped to be able to transplant about 2,000,000 of the seedlings before the end of the year.

Progress is also reported in the production of guayule rubber. According to the Mexican Economic Coordinating Committee, Mexico's output of guayule, which was 8,000 tons in 1943, is expected to reach about 12,000 tons this year. This increase will be mainly owing to the operation of three new processing plants

The Only Heavy Duty Clutch with these 12 Advantages

No levers, no arms, no toggles, no springs! Nothing to adjust, nothing to lubricate! Low maintenance cost—long wear! Clutch action as light, or as firm, as you want it. Performance proved in the toughest kind of naval service, and on hundreds of heavy machinery applications.



It works like this

Rubber and fabric air gland, on drive member, rolls free of the driven member. Compact, and free from mechanical complications.

Inflate gland—clutch engaged. Deflate gland—clutch disengaged. Torque entirely controlled by air pressure—vibration and shock absorbed.

1. Simple in design and operation
2. Flexible control by air
3. No adjustments or oiling—low maintenance
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7. Runs cooler—uniform pressure
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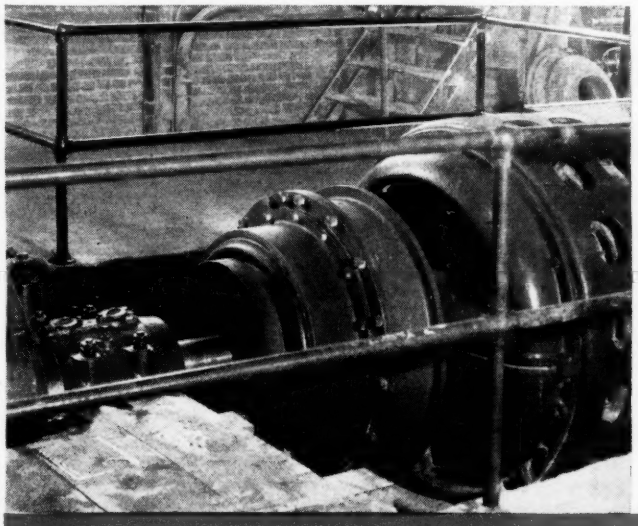
9. Greater capacity—more compact
10. Remote control by air valve
11. Replaces flexible couplings
12. Acts as clutch, slip-clutch, brake and coupling.



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Fawick Engineering Department will gladly give you detailed information on special applications, to meet your operating conditions.

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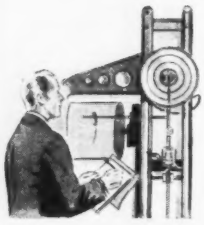

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all Stocks
use
"RAYCO" FLOCK

Rayco cotton flock for rubber compounding is not one product, but a series of types, each especially directed toward certain specific requirements. For crude, synthetic and reclaim stocks, we produce appropriate flocks, with further variations to contribute to the finished product the desired proportions of strength increase and abrasion resistance.

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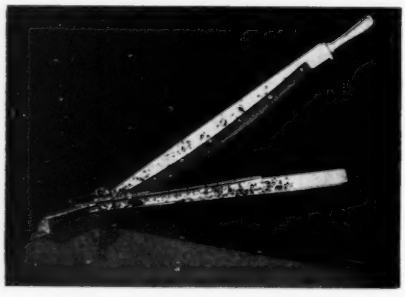
ALFA BENCH HAND TRIMMER
With Self-adjusting Clamp



A strongly constructed unit designed to mount on a bench or table. Furnished with or without clamp. Upper blade is spring balanced and will not fall of its own weight.

Suitable for cutting rubber, light gauge metals, sheet lead and cardboard; assures a clean accurate cut. Furnished in 24, 30 and 36-inch sizes.

Descriptive Circular on Request

SPADONE MACHINE COMPANY
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Representatives for ALFA MACHINE CO.

opened recently. One of the new factories is owned partly by the General Tire & Rubber Co., of Akron, O.

Satisfactory activity is noted not only in Mexico's crude rubber undertakings, but also in her rubber goods manufacturing industry. Thus in January, 1943, Mexican rubber factories converted 288,107 kilograms of rubber into a variety of goods which included: 19,857 pneumatic tires for automobiles and trucks; 3,473 tires for bicycles; 7,078 tubes for automobiles and trucks; 3,000 tubes for bicycles; 866,620 pairs of rubber heels; 2,592 pairs of rubber soles; 55 rolls of rubber tape; 11,734 meters of tubing; and 130 rubber-covered rollers.

LATIN AMERICAN NOTES

From South American sources it is learned that Bolivia shipped 1,152 tons of rubber to the United States and 329 tons to Argentina out of a total of 1,486 tons exported in 1942.

Bolivia now has a tire retreading plant where 70 truck and passenger tires are treated in a month.

It is reported from Panama that output of rubber in January and February totaled 204,343 pounds, as against 94,930 pounds in the first two months of 1943. It is expected that the 1944 harvest will surpass the 736,264 pounds collected and exported last year, especially as rubber production is increasing in all regions except Bocas del Toro.

SHADA'S *Cryptostegia* plantings in the Artibonite Plain have been severely attacked by swarms of June beetles, and the concern's activities in this territory are said to have been suspended, according to reports from Haiti.

Guatemala in 1943 exported 150,812 pounds of rubber, as contrasted with only 8,983 pounds in 1942.

EUROPE

GREAT BRITAIN

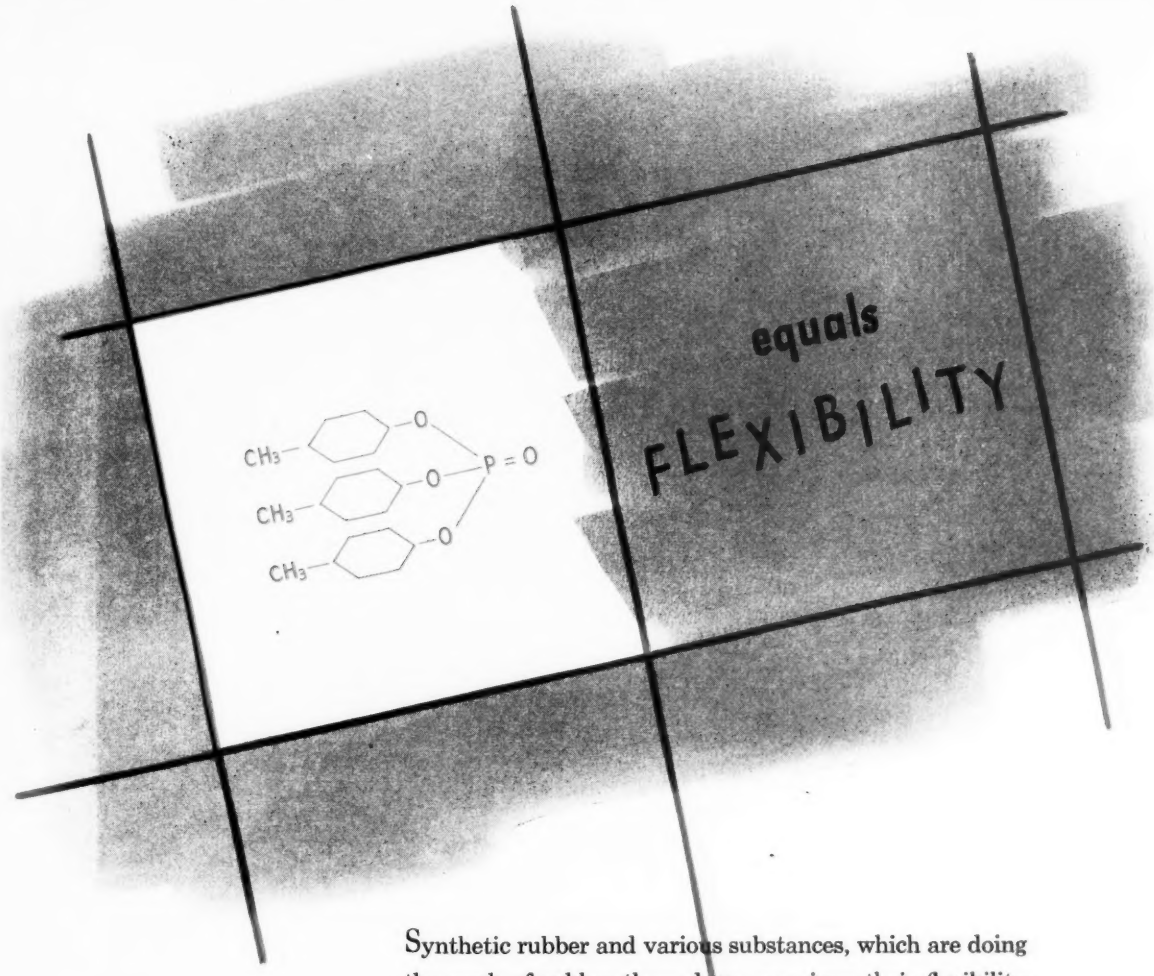
Need of Expanding Research

That Great Britain firmly intends to maintain her position in industry and commerce when hostilities have ceased is quite clear from the numerous discussions of probable postwar problems, and it is equally clear that Great Britain is acutely aware of the great importance of research as a guide and a spur in postwar activities in trade. For months the promotion of industrial research has been one of the chief topics on the agenda of various leading organizations.

The Federation of British Industries, in its report on industry and research, recommended the institution of an organization to keep alive the need of industrial research and to promote and foster it. At a conference called by this body, at which the Department of Scientific and Industrial Research, the universities, and the research associations were represented, this matter was discussed and a sub-committee was appointed to investigate and report on the matter.

The question of how best to promote scientific and industrial research has also been studied by a special committee appointed by the London Chamber of Commerce on June 8, 1943. In this committee's recently adopted report it was submitted that for full and effective development of such research, three basic essentials were required: a centralized and planned direction through a central research board, better financial support, and a larger, better-trained, better-paid staff.

The suggested central research board should act as a coordinating and directing body for all research organizations and be the link between the government and the research activities of the country as a whole. The board should be empowered to direct research associations to undertake fundamental research in directions deemed to be in the national interests; it would have to consider the effect on national trade and industry as a whole of discoveries of a fundamental nature and direct the use of such discoveries to the nation's



Synthetic rubber and various substances, which are doing the work of rubber these days, are given their flexibility by Monsanto's Tricresyl Phosphate.

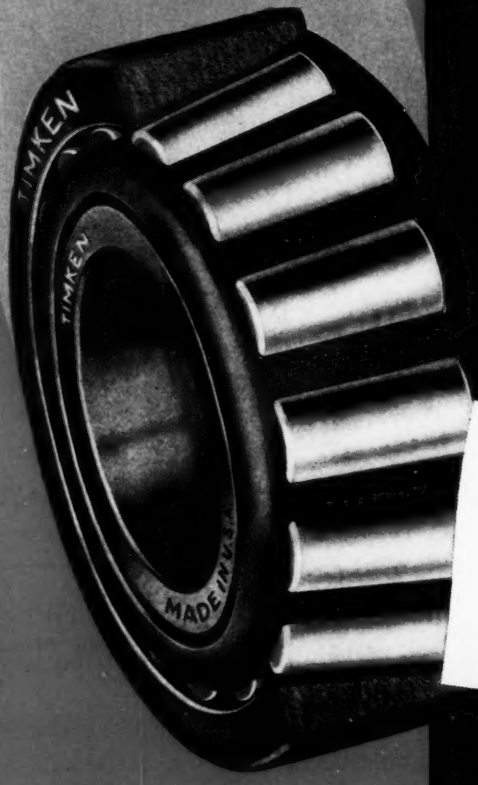
Tricresyl Phosphate, a clear, practically colorless liquid, is a solvent plasticizer that gives excellent fire resistance. It has a high boiling point and is relatively non-volatile, having an evaporation loss of less than 0.10% in 100 hours at 100°C.

Complete information on Monsanto Tricresyl Phosphate and other plasticizers and resins will be sent promptly upon request to the nearest Monsanto office or to MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

Memo for Tomorrow



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Over 3,000 sizes and types to choose from.

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To the necessary degree for any application.

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Available from strategically located district offices.

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SALABILITY
Timken Bearing Equipped machines preferred and demanded by users everywhere.

DEVOTED to the cause of Victory today, Timken Tapered Roller Bearings again will be available for all requirements — in unlimited quantities — when the time comes to "beat the swords into plowshares".

In the meantime, keep in mind the advantages listed at the right — all combined in the Timken Bearing.

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TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

best advantage. If it were found that British products were unable to meet foreign competition in markets either at home or abroad because of the poor quality or high price of a product, the matter would be taken up with research associations and the laboratories of individual firms.

The universities, it was further considered, should maintain far larger staffs of graduates and skilled laboratory technicians than at present, and a substantial increase in the numbers of research fellowships was recommended.

Finally the Chamber strongly supported the recommendation of the Parliamentary and Scientific Committee that £10,000,000 should be spent over the first five postwar years to equip and enlarge university laboratories and that the program, estimated before the war to cost £12,000,000, to increase the number of technical and arts colleges and to expand and modernize those already in existence should be carried out.

While investigations of this kind are going on, certain industries are expanding their research facilities and planning their own schemes of cooperative research. Thus it is learned that the British Electrical & Allied Industries Research Association is about to start new research laboratories at Leatherhead (Surrey) on a site next to one recently acquired by the British Coal Utilization Research Association and that it will cooperate with several other interested associations which have found that they require better facilities to meet the needs of their industries. Leatherhead, it seems, is likely to become the center of a large group of industrial research laboratories.

The Fighting Services are naturally also interested in advances in scientific research and from a question in the House of Commons it develops that, "In the preparation of plans for the organization after the war of scientific research in the national interest special consideration will be given to improving existing ways in which the results of scientific research can best be made known and applied to the development of industry and the Fighting Services."

Notes on the British Plastics Industry

Arrangements have been made by a group of British firms with the Reed-Prentice Corp., Worcester, Mass., U. S. A., to manufacture and sell the complete range of the American company's injection molding machines in England. The English companies which have formed an association are T. H. & J. Daniels, Ltd., Stroud; Francis Shaw & Co., Ltd., Manchester; and Alfred Herbert, Ltd., Coventry.

Molding presses up to 250 tons, preforming machines, injection molding machines up to eight-ounce capacity, hydraulic pumps, and hydraulic valves will be made by Daniels, Ltd. Extruding machines, presses larger than 250 tons, mixing and calendering machines, and large injection molding machines up to 22-ounce capacity will be made by Francis Shaw. Alfred Herbert, Ltd., will take charge of the sale and services of these machines and the supply of dies and molds.

"HELLO BOSS—
TELL THAT NEW GUY
TO KEEP USING
THE CAMBRIDGE"

Roll Model

Guessing roll temperatures may cause loss of both labor and material. Use the CAMBRIDGE PYROMETER. New help, new materials and new methods make it more important than ever before to use a *Cambridge*. The *Cambridge* is accurate, sturdy, quick-acting and simple to use. Send for particulars.

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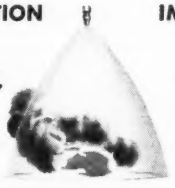
WHEREVER AN "AUTOMATIC" FIRE-FOG INSTALLATION HAS BEEN MADE, THIS IS WHAT IT DOES:

❶ STANDS GUARD DUTY AT THOSE PLACES WHERE FIRE HAZARDS EXIST DUE TO OIL OR OTHER FLAMMABLE LIQUIDS

❷ SOUNDS THE ALARM WHEN FIRE BREAKS OUT; ❸ GOES INTO ACTION IMMEDIATELY AND AUTOMATICALLY, QUENCHING THE FIRE QUICKLY AND COMPLETELY



There is no mystery about an "Automatic" FIRE-FOG System and the effective manner in which it quenches fires. FIRE-FOG's nozzle structure reduces water to a mist-like spray. This *cloaks* the flames, *cools* and *chokes* the fire, *extinguishes* the blaze . . . just the protection needed for oil quenching tanks, electric transformers, enamel dip tanks, open tanks of flammable liquids, etc.

AND NOTE THIS: At "Automatic's" Proving Ground we reproduce the fire hazard *you* face, then proceed to demonstrate the "Automatic" System that provides *exactly the protection needed.* An "Automatic" Engineer will be glad to give you the details.

"AUTOMATIC" FIRE-FOG
• IT BLANKETS
• IT ISOLATES
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A NEW LABORATORY MILL for small mill production.....

• *Send for Laboratory Mill Bulletin No. BR 100 or ask for bulletins on any of the products listed below.*

MILLS • HYDRAULIC PRESSES
EXTRUDERS • STRAINERS
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MEETING the need for small mill production and experimental batches of materials, in rubber and plastics, the EEMCO Laboratory Mill is an entirely enclosed unit complete with motor and variable speed drive, ready to operate. No specially built foundation is needed—therefore reduced installation costs are possible. EEMCO also builds a complete line of heavy duty mills in various sizes ranging from 30 to 84 inches.

EEMCO ERIE ENGINE & MFG. CO.

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The scheme for reorganizing the British Plastics Federation, unanimously decided on, includes the formation within the Federation of a number of groups, including a Plastics Materials Manufacturers' Group having a large measure of autonomy and empowered to form special sub-sections. The council of the British Plastics Federation plans to compile a glossary to include trade names and technical data to assist buyers to distinguish between and describe plastics and plastic products. This organization has also set up a small sub-committee from the publicity committee to advise the press concerning plastics and the plastics industry. This step has been found necessary because of exaggerated statements which have appeared in the press from time to time on these subjects.

Sir John Hay Wins Libel Action

The libel action of Sir John George Hay, member of the International Rubber Regulation Committee, against the London *Rubber Age*, was decided on January 17, 1944, in Sir John's favor. The London periodical had suggested in an article published in its issue of July, 1942, that Sir John had lobbied his influence in the United States and probably in England also to prevent the establishment of synthetic rubber plants after having refused to permit stocks of crude rubber to be built up in the United States. It was also intimated that Sir John, as one interested in plantation rubber in the Far East, had promoted, in his own business interests, a policy of restriction of rubber supplies in wartime.

The court was satisfied that Sir John had visited America in 1940 because of the anxiety of United States authorities over the inadequacy of their rubber stocks and that so far from obstructing United States efforts to obtain rubber, Sir John had promptly agreed to grant the American authorities the required amounts of crude plantation rubber. The writer of the article, who put in a plea of fair comment, was judged to have shown extraordinary prejudice and recklessness, but not to have been dishonest in his criticism. However the libel was considered a serious one, and the defendant was ordered to pay £250 and costs to Sir John.

Harrisons & Crosfield Centennial

The well-known firm of Far Eastern agents, Harrisons & Crosfield, celebrated its one hundredth birthday on January 1, 1944. It was on January 1, 1844, that Daniel Harrison, Smith Harrison, and Joseph Crosfield became partners in the business of dealers in tea and coffee, which Daniel Harrison and Octavius Waterhouse (who retired in 1840) had built up in Liverpool. The new enterprise started with a capital of £8000; today Harrisons & Crosfield have an issued capital of £2,155,000 and have a worldwide reputation, especially in the plantation rubber industry. The connection with rubber dates back 50 years when Heath Clark and Arthur Lampard were taken into partnership and began to expand the interests of the firm.

SWEDEN

Up to the middle of 1943, Sweden was able to obtain enough rubber to prevent its shortage from reaching the acute stage. Synthetic rubber from Germany was for some time the chief mainstay of the local rubber industry; for 1943 Germany had contracted to supply 1,800 metric tons. It is reported, however, that while the Germans were able to supply rubber according to schedule during the first six months of the year, they were not in a position to continue to do so in the latter part, and their shipments dropped to 40% of the amount contracted for.

Sweden is attempting to ease the situation by increasing domestic manufacture of synthetic rubbers and by requisitioning and reapportioning tires and tubes from deregistered vehicles. About 225,000 16-inch tires were thus obtained, to be used to equip about 10,000 trucks rebuilt with P-Boggies. The order prohibiting the use of tires of "critical" sizes on non-essential passenger cars and recommending the substitution of smaller tires or an exchange for cars requiring smaller tires, yielded a fair number of tires which were allotted chiefly to taxicabs, police cars, and ambulances. It is hoped to be able to stretch supplies so as to keep both P-Boggies and trucks using regular truck tires in operation until the end of the year. But if no additional supplies of rubber become available meantime, the existing number of vehicles operating will have to be reduced. The home production of synthetic rubber, it should be explained, is not expected to afford much relief before the latter part of the year.

Swedish activity in the production of plastics seems to be making

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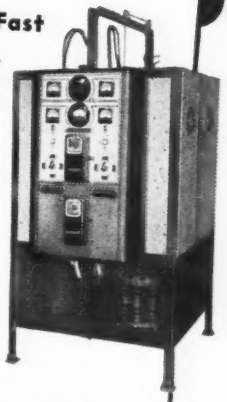
—for WEATHERING and FADING with
ATLAS-OMETERS

Twin-Arc
WEATHER-OMETER
Tests Results Twice As Fast

The new Atlas Twin-Arc Weather-Ometer has been developed to save time where speed in testing is essential.

Where Federal Specifications call for a definite number of testing hours in the Atlas single arc Weather-Ometer, this time can be cut in half in the Atlas Twin-Arc.

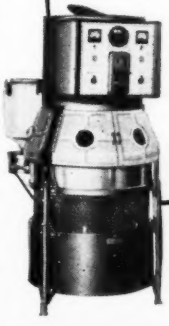


Exclusive Atlas Twin-Arc Weather-Ometer features:

1. Temperature control.
2. Unlimited range and control of Light and Water Spray Periods.
3. Adjustable and automatic timing.
4. Insulated test chamber.
5. Operates continuously 24 hours without manual attention.
6. Carbon cost 28c per day.
7. Full automatic—Safe to operate unattended overnight.
8. Control panel contains Volt and Ammeters — Time Meter—Light and Water Cycle switch—Automatic time cut off switch — Voltage adjusting switch — Direct reading thermal regulator — Reactance Coil (cut power cost in half).

The Single Arc Model is a popular machine where high speed is not required.

FADE-OMETER



The recognized standard machine of the textile trade for determining the light-fastness of materials. Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight. Temperature of the filtered air is automatically controlled. Proper humidity is furnished by evaporation from a constant-level water reservoir. Available with a wide variety of specimen holders and exposure masks.

● Originators and sole manufacturers of accelerated testing devices for a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

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ANTIMONY
FOR RED RUBBER

....The utmost in pleasing appearance with no deteriorating effect whatever.

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gratifying progress, especially the manufacture of materials for insulation purposes formerly imported. Shortages of methanol and phenol are leading to increased use of furfural for formalin. It is said that 60% less phenol is required when furfural is used and that the resultant plastic is not only quite satisfactory, but cheap to produce. The Swedish tannin extract industry yields important amounts of furfural as a by-product, and this substance is finding an increasing use as raw material in the plastics industry.

The Swedish Government Laboratories has developed a phenolic varnish which is used not only as insulation for conductor wires, but also to coat metals for the canning industry.

BULGARIA

Synthetic rubber is being produced in Bulgaria by a method similar to that used in Germany, and from what can be gathered from press reports this rubber is employed chiefly for civilian footwear. It seems that recently the Bulgarian Government granted a credit of 50 million leva to a Bulgarian engineer, a Dr. Nikolinski, for the construction of a factory which will produce nothing but synthetic rubber for this purpose. Necessary machinery, probably of German origin, will be permitted to enter duty-free. Apparently various footwear manufacturers, including the newly established branch of the Bata company in Bulgaria, are to participate in the ambitious program according to which it is hoped to make a million pairs of shoes the first year.

Bulgaria has also begun to take an interest in growing *kok-saghyz* and is planting it in various parts of the country to determine the best-suited districts. So far it has been found that the plant grows best in the rich wet fields along the Danube. It is planned to start cultivating *kok-saghyz* on a large scale next year.

RUMANIA

According to Nazi plans Rumania was to have been a source not only of oil, but of important chemicals and synthetic rubber, as witness the remarkable activity in those directions in the past year or so. For while the cultivation of *kok-saghyz* and the production of synthetic rubber apparently were begun at least a few years before 1940, the recent rapid developments in these and the chemical fields is undoubtedly due to the encouragement and assistance of the Nazis.

The production of *kok-saghyz* seems to have been confined to Bessarabia though it had been planned to introduce the culture to other suitable regions, but these plans, and especially those envisaging the expansion of existing areas, will have been frustrated by the Russian advance.

The production of synthetic rubber in Rumania was begun on a small scale about 1937 or 1938; in 1938 a monthly output of eight tons of rubber was reported, in 1939 and 1940 the monthly average had risen to 53 tons; this dropped to 40 tons in 1941, but rose again to 70 tons in 1942, and to something like 125 metric tons during 1943.

In order to serve the rapidly growing chemical industries—including the rubber industry, of course—the Rumanian power industry was reorganized, and new pipe lines have been constructed to convey the natural gas, the use of which has increased so enormously.

In view of the rapidly expanding rubber industry it is worth noting that the rubber shortage in Rumania is nevertheless so acute that only reclaim is being used for manufacturing accessories for the electrical industry.

FRANCE

About the middle of March, Royal Air Force Lancasters equipped with "factory busters" attacked the plant of the Michelin rubber company at Clermont-Ferrand, 30 miles southwest of Vichy, and returning Lancaster pilots stated that one factory was completely destroyed. Clermont-Ferrand is still one of the most important rubber centers on the Continent of Europe and even under the Nazis is capable of producing 300,000 tires a month.

Editor's Book Table

BOOK REVIEWS

"Elastic and Creep Properties of Filamentous Materials and Other High Polymers." Herbert Leaderman. Foreword by Harold deWitt Smith. The Textile Foundation, Washington, D. C. Paper, 7 x 10¼ inches, 278 pages. Index. Price $2.

This book gives the results of an investigation on the elastic and creep properties of filamentous materials, carried out at the Massachusetts Institute of Technology under the auspices of The Textile Foundation. The work was conducted under the general direction of Professor E. R. Schwarz, as a part of a program of research on the mechanical and optical properties of filamentous materials.

Dr. Leaderman first surveyed and evaluated the several theories and meager data recorded since the beginning of the Nineteenth Century and then used this as the foundation on which to base a coordinated examination of the behavior of a variety of textile fibers and plastic materials under the influence of external and internal forces acting along the dimension of time, it is stated in the foreword. The phenomenon of delayed elasticity (or "primary creep") together with the relation between this phenomenon and the structure of high polymers is discussed in Part I, which contains three chapters. The first treats of the delayed-elastic behavior of materials in the light of historically important work presented in the literature, and in the second chapter the mechanical model analogy is developed in relation to the theories of Maxwell and Wiechert. The discussion of creep behavior in the first two chapters and the presentation of the contemporary concepts of structure in the third chapter are given with reference to high polymers in general. The micelle theory, the continuous structure theory, and the fringe and kinetic theories of structure are discussed in this last chapter with considerable reference to rubber-like as well as to textile materials.

The account of experiments carried out by the author on the creep and creep recovery behavior of rayon, nylon, and silk filaments comprises Part II of the book, which contains four chapters. The various types of apparatus used are described, the experimental results obtained are interpreted in terms of the structure of these materials, and conclusions are drawn concerning the mechanism of elastic and plastic deformation of textile filaments.

The book, which is printed by the multigraph process, is well illustrated and contains a bibliography of references arranged in order of year of publication; the authors' names for each year are arranged alphabetically.

"Emulsion Technology. Theoretical and Applied. Including the Symposium on Technical Aspects of Emulsions." Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y. 1943. Cloth, 8½ by 5½ inches, 290 pages. Index. Price $5.

Among the 20 European scientists who comprise the contributing editors to this volume are several outstanding colloid chemists. The book is a new edition, with some revisions and additions by American specialists, of the papers presented at the second symposium on emulsions sponsored by the British Section of the International Society of Leather Trades Chemists. Three editions of the original volume were exhausted.

The first chapters deal with the fundamental technical aspects and the mechanics of emulsification. Practical applications to medicine, agriculture, and the rubber, food, paint and varnish, and other industries follow. Chapters on the design of emulsifying machinery, industrial emulsion formulation, and a discussion on emulsions in the patent literature, including about 250 references, add satisfactory detail and completeness to the volume.

A short chapter on rubber latex by H. P. and W. H. Stevens, consultants to the Rubber Growers' Association, briefly describes the latex of several species of rubber. The latex of *Hevea brasiliensis* and its coagulation and concentration, and the conversion of compounded latex to rubber are related more fully.

There is a comprehensive list of important emulsifying agents, and each chapter is generously supplied with references.

"Collective Security: The Why and How." No. 9 in *"America Looks Ahead"*, a Pamphlet Series. Joseph H. Ball. Published by World Peace Foundation, 40 Mt. Vernon St., Boston, Massachusetts. October, 1943. Cloth, 5¼ by 7¼ inches, 64 pages. Price 50¢.

Joseph H. Ball, of Minnesota, one of the four senators recently identified as the B_2H_2 group in connection with Senate Resolution 114, proposes a method of preventing future wars and the fear of aggression through a system of collective security of sovereign

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states to be organized by the United Nations. He maintains that such a security is the only one which the United States can realistically hope for, and that in any case a security achieved by militarism or alliances would necessitate the sacrifice of much of our democracy. Any other solution than a limited form of government on a world level would violate the principles for which the United Nations are fighting this war, Mr. Ball states. He outlines the minimum international authority necessary to settle disputes between nations and to thwart by an international police force attempts of military aggression. Leadership for postwar planning has been thrust upon the United States, and this statement of the problems involved urges strong and clear action by Congress at any early date.

NEW PUBLICATIONS

"Hercules Chemist." Oscar A. Pickett, Editor. No. 13. Hercules Powder Co., Wilmington, Del. 26 pages. This well-illustrated and attractive booklet includes in this issue information on Hercules resins for paper converting operations, on Hercules chemical cotton pulp, Hercules Dresinates, cellulose nitrate plastics, and Vinsol resin, and concludes with a page on recent developments from Hercules. The section on resins for paper converting has a supplementary table which gives the properties and applications of 36 different resins. The uses of chemical cotton pulp in the production of nitrocellulose, cellulose acetate, ethyl cellulose, viscose rayon, cuprammonium rayon, and paper are explained. Dresinates, the sodium and potassium salts of modified rosins, are also described as to properties and applications. A table is presented comparing the physical properties of cellulose nitrate plastic with other cellulosic plastics of equal hardness in the section on cellulose nitrate plastic. Included in the section on recent developments is information on Hercules chlorinated paraffins and Paracols, which are fully fluid liquids containing wax in suspension in water.

"Perbunan Compounding and Processing Manual. Tentative Supplement No. II." Section No. IX. Stanco Distributors, Inc., 26 Broadway, New York, N. Y. 9 pages. This tentative supplement is being issued to present suggested Perbunan formulations for some applications in accordance with the S.A.E. aeronautical material specifications as revised October 1, 1943. All data presented are based on laboratory methods as recommended by the A.S.T.M. It is pointed out that no one suggested compound or series of compounds can be universally applicable to all methods of processing, preparation, or forming, and it is stated that the formulation shown were designed with the idea that they could be readily adapted, but are not presented as universal "cure-alls." Formulae and test data for hydraulic fluid (petroleum base) resistant, low temperature resistant, extreme pressure lubricant resistant, and coolant resistant compounds are given.

"Taylor Pneumatic Set Controller." Taylor Instrument Cos., P. O. Box 110, Rochester 1, N. Y. Bulletin 98159. 8 pages. This bulletin covers both the uses and operating principles of the Fulscope pneumatic set controller, which offers a versatile, highly responsive control in applications where a temperature, a pressure, a rate of flow, or a liquid level must automatically conform to changes in another variable related to the same process. The instrument is reported as available in either single-duty recording or indicating forms, single or double record, single or double indication. The bulletin is liberally illustrated with photographs and simplified application drawings.

"'Thiokol' Type 'FA'—Buna S Blends." Technical Service Bulletin No. 19. Thiokol Corp., Trenton, N. J. 7 pages. Stating that "Thiokol" Type "FA" may be blended with GR-S in all proportions to effect modifications of vulcanized and unvulcanized characteristics, this bulletin presents data on such mixtures to assist the compounder in attaining such specific properties as he may require. In blending it is recommended that the "Thiokol" and the GR-S batches be mixed separately and then blended to obtain the desired polymer ratio. Any fillers ordinarily used in rubber compounding may be used in either or both phases of the blend, and the choice of the accelerators used in the GR-S phase is limited somewhat by consideration of the effect of the accelerators on the "Thiokol" Type "FA", it is stated. Other items covered are the variation in physical properties of tensile, abrasion resistance and elongation, and the effect of blending on solvent and oil resistance, tear resistance, etc. Base formulae for low-loaded and high-loaded GR-S stocks and their use in various combinations with a "Thiokol" Type "FA" stock containing 60 parts of SRF black are given.

"**Lode**—A Soft 'Mineral Rubber' for Use with GR-S." R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. 8 pages. The results obtained with Lode, a compounded asphalt product somewhat comparable to mineral rubber, in GR-S tread compounds, mechanical goods compounds with high loadings of filler, and in heel compounds, are presented in this booklet. Lode is described as highly viscous at room temperature, but flowing freely at 160°-210° F. and having a specific gravity of 1.08. It is suggested as a plasticizer in GR-S tread compounds, and mechanical goods compounds containing Lode and not more then about 50% of GR-S by volume are said to process well in the factory. Lode is also reported as satisfactory in compounds for electrical insulation.

"**Liquid Densities of Eleven Hydrocarbons Found in Commercial C_4 Mixtures.**" Compiled by C. S. Cragee. National Bureau of Standards, Washington, D. C. Letter Circular LC-736. 25 pages. This booklet, prepared at the request of the Rubber Reserve Co. for a standard table of liquid densities of six C_4 hydrocarbons occurring in feed stocks for 1,3-butadiene manufacture for use in weight and volume conversions, also includes data on two C_3 hydrocarbons, propane and propene, and two C_5 hydrocarbons, n-pentane and iso-pentane, since these are usually present to a minor extent in the C_4 fraction. Three separate tables in different units are used to present the data, which include butadiene as the eleventh hydrocarbon. One table gives the values in grams per milliliter, one in pounds per gallon, one gives density ratios relative to the density at 60° F., and all cover the temperature range —50° to 140° F., tabulating values at every 1° F. from 0° to 120° F. and every 2° F. outside this interval. The booklet also contains information on the experimental basis of the tables, a comparison of results of various observers with the tables, references containing data on liquid densities, etc.

"**Rubber, Polyisoprenes, and Allied Compounds.** Part IV. The Relative Tendencies towards Substitutive and Additive Reaction during Chlorination." Publication No. 37. The British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C.3, England. 8 pages. According to the summary of this paper, it has been previously observed that when chlorine reacts with rubber, much hydrogen chloride is evolved, which suggests that the halogenation process may be one of substitution and not of addition at the double bonds. The character of this reaction as it applies to rubber and to other olefins containing the group $-CH_2-CMe=CH-CH_2-$ has been examined. The main reaction appears undoubtedly to be substitutive, but the products show marked loss of unsaturation as determined by the iodine-value method. This loss is probably partly real, due to the occurrence of some degree of cyclization, and partly apparent, due to inhibition by the incorporated chlorine atoms of ready iodine chloride addition during the determination.

"**The Outlook for Synthetic Rubber.**" Melvin A. Brenner. National Planning Association, 800 21st St., N.W., Washington 6, D. C. Planning Pamphlets No. 32. Price 25¢. 32 pages. This pamphlet is described in the foreword as an attempt to furnish background in terms of present facts and future probabilities against which various policy alternatives for the synthetic rubber industry after the war may be better analyzed and understood. The material is adapted from a study made by the author when he was associated with the National Resources Planning Board and includes much information from articles in various technical journals, the progress reports of the Rubber Director, and hearings on synthetic rubber before the Congressional committees. The conclusions reached are that the general outlook for synthetic rubber after the war is favorable, that it may eventually be cheaper and better than the natural product, and the government will in any event provide sufficient protection so that at least a nucleus will survive.

"**Classified Directory** of Consulting Chemists and Chemical Engineers." Eighth Edition. 1944. Association of Consulting Chemists & Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y. 96 pages. This latest, revised, and enlarged eighth edition of the "Classified Directory of Consulting Chemists and Chemical Engineers" lists in Section I the key sheet in which fields covered by the various consultants, such as acids, catalysis, colloids, rubber, metals, organic research, plastics, etc., are given, and the members or firms specializing or qualified to work in the different fields are indicated by their key numbers. An index of page and key numbers, which have been made identical for easy reference precedes the main key sheet. Detailed scope sheets giving qualifications of the many consultant firms, their scope, and activities comprise the main portion of the directory. A membership list in alphabetical order and also according to geographical location is included, and excerpts from the code of ethics and the by-laws of the Association are found on the inside front and back covers of the directory.

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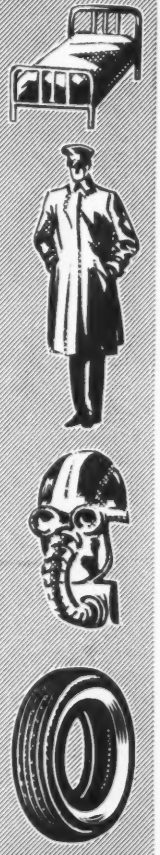

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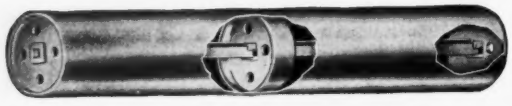
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"Geon Resins & Plastics." The B. F. Goodrich Co., Akron, O. 4 pages. Description of the unique group of polyvinyl resins and plastics recently developed and offered for distribution to industrial users under the trade name of Geon is contained in this attractive four-page folder. One page is devoted to an outline of the characteristics of the four Geon resins, two of which are special polymers of vinyl chloride reported to have special advantages as to thermal and light stability, toughness and general inertness, and the other two resins which are vinyl chloride: vinylidene chloride copolymers and are said to combine increased solubility and thermoplasticity with exceptional stability, chemical resistance, and wide useful temperature range. The other pages cover the formulation necessary to produce compositions of varying properties and give suggested applications for these resins.

"Salvage Manual for Industry." Technical Service Section, Industrial Salvage Branch, Salvage Division, War Production Board. Superintendent of Documents, Government Printing Office, Washington, D. C. 252 pages. Price 50¢. Instructions for efficient salvaging of secondary waste materials are described in detail in this manual to promote salvage programs to aid the war effort and to conserve primary raw materials in both war and peace. Complete plant procedures are given for salvage of both metal scrap and nonmetallic waste. There is a chapter on salvage practices for solvents, paints, and plastics. Rubber is briefly treated under "Miscellaneous Non-metallic Wastes." A classified list of scrap items based on a revision of the "Waste Materials Dictionary" published by the American Society of Mechanical Engineers is included.

"Rayon Fabrics. Definitions of Rayon Fabrics and Terms Used in Connection with Rayon." American Viscose Corp., New York, N. Y. 64 pages. This booklet consists of two parts, one containing an extensive glossary of rayon fabrics and of terms used in connection with rayon, and the other having well-illustrated descriptive matter on what rayon is, how it is made, woven, knit, dyed, printed, finished, and tested. The booklet concludes with a discussion of the meaning of labels attached to rayon fabrics and yarns which have resulted from fabric testing programs intended to make available to the public scientific information on fabric serviceability.

"War Worker Transportation." Institute of Traffic Engineers, 1943. This factual survey was made by Theodore M. Matson, director of the Bureau for Street Traffic Research of Yale University to provide data useful to the solution of war worker Transportation problems and develop procedures helpful to personnel transportation in the postwar period. Transportation at 48 plants was studied to develop a series of recommendations for safe and efficient methods. There are clear evaluations of parking and terminal arrangements, staggered hours, access roads, group riding, and other practices.

"How to Prevent Truck Tire Failures." The B. F. Goodrich Co., Akron, O. 16 pages. The eight factors which cause most truck tire failures, i.e., overloading, improper inflation, excessive speed, impacts, mechanical irregularities, improper matching of duals, cuts, and punctures are illustrated in this booklet, and suggested remedies given for the purpose of educating the users of new synthetic truck tires as to the extra care required with these tires, since they will not take the punishment crude rubber truck tires are built to take.

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Regular and Special Constructions
of
COTTON FABRICS

Single Filling **Double Filling**
and
ARMY
Ducks

HOSE and BELTING
Ducks

Drills

Selected
Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

Market Reviews

COTTON & FABRICS

ACTIVITY in the April cotton market consisted in a quiet first week with prices holding within a narrow range downward, a very sharp rally in the second week, and in the third a very sharp break, followed by the tendency to improve and grow firm. The principal favorable factors were: the unfavorable reports regarding the planting of the new crop and the labor situation in the South, institution of WMC General Order 12 placing the industry on a minimum working week of 48 hours (beginning May 14), continued demands for higher wages and governmental efforts to solve other problems. Continued mill and trade price fixing against heavy military textile orders was the chief support to the near-by futures. Distants, which gained the most, owed their strength to commission house and local buying. The easing factors were: rumors of peace, the previous month's further drop in the daily rate of domestic consumption of all cottons, the growing belief that continental invasion is imminent, and, to some degree, the report of WPB's possible intention to freeze prices and production of all textiles and clothing at 1943 levels.

The price of $^{15}/_{16}$-inch spot middling cotton closed March 31 at 21.75¢, fluctuated alternately narrowly and sharply between the high 21.95¢ on April 11 and the low of 21.51¢ on April 18, and closed May 1 at 21.51¢.

Cotton acreage this year may be the smallest since 1895. The estimated planted total is 22,050,000 acres or less, as compared with 22,151,000 last year. The March 1 report of the Department of Agriculture shows the number of farm workers to be at the lowest level for that date in 20 years.

United States consumption of cotton is estimated at about 10,200,000 bales for the season ending July 31, as against last season's 11,100,000.

Spinning has decreased; operation in March was 122% of capacity, as against 134.4% in March, 1943.

Fabrics

Manufacturers are in dire need of more material; while production decreases steadily with acute manpower shortage a serious cause. Ceiling prices have remained unchanged, although OPA promised swifter adjustment action, and the whole situation is closely controlled by the general directives issued to govern prices, production and distribution, and labor problems. Every type of duck 15 inches or more in width is now entirely controlled by WPB, according to the amended M-91. The industry complains that through the conflicting directives issued by the several government agencies, the worst state of confusion ever known now exists. The duck directive is called impossible and a death sentence to some producers. Ever the desired 48-hour week law brings further problems to be solved.

Inquiry has been maintained, but transactions have been very rare and small. Sheetings and herringbone have seen activity for the military. Interest has been keen regarding the additional millions of yards of 8.60 yard print cloth needed for surgical gauze and waterproof packing of armament parts. Civilian trade is completely unsatisfied.

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Feb. 26	Mar. 25	Apr. 1	Apr. 6	Apr. 15	Apr. 22
May	20.64	21.13	21.13	21.14	21.25	21.25
July	20.11	20.63	20.73	20.78	20.92	20.81
Oct.	19.42	19.99	20.03	20.05	20.03	19.86
Dec.	19.23	19.80	19.88	19.86	19.83	19.64
Jan.	19.16	19.73	19.82	19.79	19.75	19.56
Feb.	....	....	19.72	19.73	19.69	19.54

New York Quotations

April 28, 1944

Drills		
38-inch 2.00-yard	yd.	....
40-inch 1.45 yard	:	....
50-inch 1.52-yard	:	$0.29
52-inch 1.85-yard	:	.23⅞
52-inch 1.90-yard	:	.23223/.2325
52-inch 2.20-yard	:	.20511
52-inch 2.50-yard	:	.185
59-inch 1.85-yard	:	.23851
Ducks		
38-inch 2.00-yard D. F.	yd.	.215/.22⅝
40-inch 1.45-yard S. F.	:	.2975
51½-inch 1.35-yard D. F.	:	.335
72-inch 1.05-yard D. F.	:	.43/.45
72-inch 17-21 ounce	:	.48⅞
Mechanicals		
Hose and belting	lb.	.4275
Tennis		
51½-inch 1.35-yard	yd.	.315
51½-inch 1.60-yard	yd.	.27⅛
51½-inch 1.90-yard	yd.	.23⅜
Hollands — White		
Blue Seal		
20-inch	yd.	.135
30-inch	:	.2425
40-inch	:	.27
Gold Seal		
20-inch	yd.	.145
30-inch	:	.2575
40-inch	:	.29
Red Seal		
20-inch	yd.	.1225
30-inch	:	.22
40-inch	:	.245
Osnaburgs		
40-inch 2.34-yard	yd.	.155⅝
40-inch 2.48-yard	:	.14⅝
40-inch 2.56-yard S. F.	:	.14578
40-inch 3.00-yard	:	.1275
40-inch 7-ounce part waste	:	.15
40-inch 10-ounce part waste	:	.21⅜
37-inch 2.42-yard clean	:	.1525
Raincoat Fabrics		
Cotton		
Bombazine 64 x 60	yd.	....
Plaids 60 x 48	:	....
Surface prints 64 x 60	:	....
Print cloth, 38½-inch, 64 x 60	:	.08971
Sheeting, 40-inch		
48 x 48, 2.50-yard	yd.	.16200
64 x 68, 3.15-yard	:	.13968
56 x 60, 3.60-yard	:	.11944
44 x 40, 4.25-yard	:	.09764
Sheetings, 36-inch		
48 x 44, 5.00-yard	yd.	.08600
40 x 40, 6.15-yard	:	.06991
Tire Fabric:		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.48
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.48
9¾ ounce 60" 10/2 ply Karded peeler	lb.	.45
Cord Fabrics		
23/5/3 Karded peeler, 1⅛" cotton	lb.	.44
15/3/3 Karded peeler, 1⅛" cotton	lb.	.42
12/4/2 Karded peeler, 1⅛" cotton	lb.	.42
23/5/3 Karded peeler, 1¼" cotton	lb.	.44
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.45

Fixed Government Prices*

Balata	Price per Pound: Civilian Use	Price per Pound: Other Than Civilian Use
Manaos Block	$0.38¾	$0.38¾
Swinam Sheet	.42½	.42½
Guayule		
Guayule (*carload lots*)	.17½	.31
Latex		
Normal (*tank car lots*)	.26	.43½
Creamed (*tank car lots*)	.26¾	.44¼
Centrifuged (*tank car lots*)	.27¾	.45¼
Heat-Concentrated (*carload drums*)	.29½	.47
Plantation Grades		
No. 1X Ribbed Smoked Sheets	.22½	.40
1X Thin Pale Latex Crepe	.22½	.40
2 Thick Pale Latex Crepe	.22	.39½
1X Brown Crepe	.21¾	.38⅞
2X Brown Crepe	.21⅜	.38⅝
2 Remilled Blankets (Amber)	.21¼	.38¾
3 Remilled Blankets (Amber)	.21⅛	.38⅝
Rolled Brown	.18	.35½
Synthetic Rubber		
GR-M (Neoprene GN)	.27½	.45
GR-S (Buna S)	.18½	.36
GR-I (Butyl)	.15½	.33
Wild Rubber		
Upriver Coarse (crude)	.12⅝	.26⅛
(washed and dried)	.20¼	.37¾
Islands Fine (crude)	.14⅝	.28¼
(washed and dried)	.22½	.40
Caucho Ball (crude)	.11⅝	.24¾
(washed and dried)	.19½	.37
Mangabiera (crude)	.08½	.19¾
(washed and dried)	.18	.35½

*For a complete list of all grades of all rubbers, including crude, balata, guayule, synthetic, and latex, see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.

Scrap Rubber Ceilings

Inner Tubes†	¢ per Lb.
No. 2 passenger tubes	7¾
Red passenger tubes	7½
Passenger tubes	6
Tires‡	**$ per Short Ton**
Mixed passenger tires	20.00
Beadless passenger tires	26.00
Solid tires	36.00
Peelings†	
No. 1 peelings	47.50
No. 2 peelings	47.50
No. 1 light colored (zinc) carcass	52.50
Miscellaneous Items‡‡	
Air brake hose	25.00
Miscellaneous hose	17.00
Rubber boots and shoes	33.00
Black mechanical scrap above 1.15 sp. gr.	20.00
General household and industrial scrap	15.00

† All consuming centers except Los Angeles.
‡ Akron only.
‡‡ All consuming centers.

Reclaimed Rubber Prices

Auto Tire	Sp. Grav.	¢ per Lb.
Black Select	1.16–1.18	6½/ 6¾
Acid	1.18–1.22	7½/ 7¾
Shoe		
Standard	1.56–1.60	7 / 7¼
Tubes		
Black	1.14–1.26	11¼/11½
Gray	1.15–1.26	12½/13¼
Red	1.15–1.32	12 /12¾
Miscellaneous		
Mechanical blends	1.25–1.50	4½/ 5½
White	1.35–1.50	13½/14½

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

It is a cause for gratification to us that eleven of the mills we represent have been awarded the Army-Navy "E".

SHAWMUT MILL
LANGDALE MILL
LANETT MILL
FAIRFAX MILL
RIVERDALE MILL
EQUINOX MILL
BROOKSIDE MILLS
THE DIXIE COTTON MILLS
PIEDMONT COTTON MILLS
PALMETTO COTTON MILLS
ANCHOR DUCK MILLS

Since the war began we have tried to give the Government the greatest quantity of the most needed fabrics. The records of the mills we represent speak for themselves. Eleven have received "E" awards.

Whenever Army and Navy requirements are filled, we'll again be free to render a most complete service in the field of industrial fabrics.

WELLINGTON SEARS COMPANY
65 Worth Street, New York 13, N. Y.

COMPOUNDING INGREDIENTS

Current Quotations*

Abrasives

Pumicestone, powdered	lb.	$0.035	/$0.04
Rottenstone, domestic	lb.	.025	.03

Accelerators, Inorganic

Lime, hydrated, *l.c.l.*, New York	ton	25.00	
Litharge (commercial)	lb.	.09	
Magnesia, calcined, heavy	lb.		
technical, light	lb.	.0625/	.07

Accelerators, Organic

A-1	lb.	.28	/ .33
A-10	lb.	.36	/ .42
A-19	lb.	.52	/ .65
A-32	lb.	.60	/ .70
A-46	lb.	.50	/ .57
A-77	lb.	.42	/ .55
A-100	lb.	.42	/ .55
Accelerator No. 8	lb.	.63	/ .65
49	lb.	.41	/ .42
552	lb.	1.63	
808	lb.	.59	/ .61
833	lb.	1.13	/ 1.15
Acrin	lb.	.65	
Advan	lb.	.55	
Aldehyde ammonia	lb.	.65	/ .70
Altax	lb.	.43	/ .45
Arazate	lb.	1.53	
B-J-F	lb.	.38	/ .43
Beutene	lb.	.59	/ .64
Butasan	lb.	1.13	
Butazate	lb.	1.13	
Butyl Eight	lb.	.97	/ .99
C-P-B	lb.	1.95	
Captax	lb.	.38	/ .40
D-B-A	lb.	1.95	
Delac A	lb.	.39	/ .48
O	lb.	.39	/ .48
P	lb.	.39	/ .48
Di-Esterex-N	lb.	.50	/ .57
DOTG (Diorthotolyguinidine)	lb.	.44	/ .46
DPG (Diphenylguanidine)	lb.	.35	/ .45
El-Sixty	lb.	.40	/ .47
Erie Accelerator	lb.	.60	/ .62
Ethasan	lb.	1.13	
Ethazate	lb.	1.13	
Ethylidene Aniline	lb.	.42	/ .43
Formaldehyde P.A.C.	lb.	.06	/ .0625
Formaniline	lb.	.36	/ .37
Guantal	lb.	.39	/ .48
Hepteen	lb.	.34	/ .39
Base	lb.	1.25	/ 1.40
HexamethylenetetramineU.S.P	lb.	.39	
Technical	lb.	.33	
Lead oleate, No. 999	lb.	.135	
Witco	lb.	.15	
Ledate	lb.	1.48	
MBT	lb.	.38	/ .40
MBTS	lb.	.43	/ .45
Methasan	lb.	1.23	
Methazate	lb.	1.23	
Monex	lb.	1.53	
Morfex "33"	lb.	.67	/ .72
"55"	lb.	.96	/ 1.01
O-X-A-F	lb.	.38	/ .43
Para-nitroso-dimethylaniline	lb.	.85	
Pentex	lb.	.74	/ .84
Flour	lb.	.1225/	.1325
O	lb.		
Flour	lb.		
Phenex	lb.	.49	/ .54
Pipazate	lb.	1.53	
Pip-Pip	lb.	1.63	
Polyac	lb.	1.25	
R & H 50-D	lb.	.42	/ .43
Rotax	lb.	.48	/ .50
Safex	lb.	1.15	/ 1.25
Santocure	lb.	.60	/ .67
Selenac	lb.	1.98	
SPDX-G	lb.	.53	/ .58
SRA No. 1	lb.	.53	/ .55
Super-Sulphur No. 2	lb.	.13	/ .15
Tetrone	lb.	1.53	
A	lb.	2.20	
Thiocarbanilide	lb.	.28	/ .33
Thiofide	lb.	.43	/ .50
Thionex	lb.	1.53	
Thiotax	lb.	.38	/ .45
Thiurad	lb.	1.53	
Thiuram E	lb.	1.53	
M	lb.	1.53	
Trimene	lb.	.54	/ .64
Base	lb.	1.03	/ 1.18
Triphenylguanidine (TPG)	lb.	.45	
Tuads	lb.	1.53	
Tuex	lb.	1.53	
2-MT	lb.	.58	/ .60
Ulto	lb.	.99	/ .04
Ureka	lb.	.50	/ .57
Blend B	lb.	.50	/ .57
C	lb.	.48	/ .55
Vulcanex	lb.	.42	/ .43
Z-B-X	lb.	2.45	
Zenite	lb.	.40	/ .42
A	lb.	.45	/ .47
B	lb.	.42	/ .44
Special	lb.	.47	
Zimate, Butyl	lb.	1.13	
Ethyl	lb.	1.13	
Methyl	lb.	1.23	
Zipacel	lb.	1.65	

Activators

Aero Ac 50	lb.	$0.46	/$0.52
Barak	lb.	.50	
MODX	lb.	.295 /	.345
SL-20	lb.	.1089/	.1135

Age Resisters

AgeRite Alba	lb.	1.95	/ 2.05
Gel	lb.	.52	/ .54
Hipar	lb.	.61	/ .63
Powder	lb.	.43	/ .45
Resin	lb.	.43	/ .45
D	lb.	.43	/ .45
White	lb.	1.23	/ 1.33
Akroflex C	lb.	.53	/ .55
Albasan	lb.	.69	/ .74
Aminox	lb.	.43	/ .52
Antox	lb.	.54	/ .56
Betanox	lb.	.43	/ .52
B-L-E	lb.	.43	/ .52
Powder	lb.	.61	/ .70
B-X-A	lb.	.43	/ .52
Copper Inhibitor X-872-A	lb.	1.15	
Flectol H	lb.	.43	/ .55
White	lb.	.89	/ 1.00
M-U-F	lb.	1.48	
Neozone (standard)	lb.	.61	/ .63
A	lb.	.43	/ .45
C	lb.	.43	/ .45
D	lb.	.43	/ .45
Distilled	lb.	.48	/ .50
E	lb.	.61	/ .63
Oxynone	lb.	.77	/ .90
Permalux	lb.	1.18	/ 1.20
Santoflex B	lb.	.43	/ .45
BX	lb.	.54	/ .64
Santovar-O	lb.	1.15	/ 1.40
Solux	lb.	1.28	/ 1.30
Stabilite	lb.	.48	/ .69
Alba	lb.	.50	/ .74
Thermoflex A	lb.	.61	/ .63
C	lb.	.54	/ .56
Tysonite	lb.	.165	/ .1725
V-G-B	lb.	.43	/ .52

Alkalies

Caustic soda, flake, Columbia (400-*lb. drums*)	100 lbs.	2.70	/ 3.55
Liquid, 50°C.	100 lbs.	1.95	
Solid (100-*lb. drums*)	100 lbs.	2.30	/ 3.15

Antiscorch Materials

Antiscorch T	lb.	.90	
Cumar RH	lb.	.105	
E-S-E-N	lb.	.34	/ .39
R-17 Resin (*drums*)	lb.	.1075	
RM	lb.	1.25	
Retarder W	lb.	.36	
Retardex	lb.	.445 /	.475
U-T-B	lb.	.34	/ .39

Antiseptics

Compound G-4	lb.	1.25	
G-11	lb.	5.65	

Antisun Materials

Heliozone	lb.	.23	/ .24
S.C.R.	lb.	.32	/ .34
Sunproof	lb.	.2275/	.2775

Blowing Agents

Ammonium carbonate, lumps (500-*lb. drums*)	lb.	.0825	
Unicel	lb.	.50	

Brake Lining Saturant

B.R.T. No. 3	lb.	.0175/	.0185

Colors

Black

Lampblack (commercial), *l.c.l.*	lb.	.15	

Blue

Du Pont Powders	lb.	2.25	/ 3.75
Heliogen BKA	lb.		
Toners	lb.		

Brown

Mapico	lb.	.1135	

Green

Chrome	lb.	.25	
Oxide (*freight allowed*)	lb.	.25	
Du Pont Powders	lb.	1.00	
Guignet's (*bbls.*)	lb.	.70	
Toners	lb.		

Orange

Du Pont Powders	lb.	2.75	/ 3.05
Toners	lb.		

Orchid

Toners	lb.	†	

Pink

Toners	lb.	†	

Purple

Toners	lb.	†	

Red

Antimony Crimson, 15/17%	lb.		
R.M.P. No. 3	lb.	$0.48	
Sulphur free	lb.	.52	
Golden 15/17%	lb.		
7-A	lb.	.37	
Z-2	lb.	.25	
Cadmium, light (400-*lb. bbls.*)	lb.	.85	
Du Pont Powders	lb.	.48	/$1.65
Iron Oxide, *l.c.l.*	lb.	.07	/ .15
Mapico	lb.	.0885/	.096
Rub-Er-Red (*bbls.*)	lb.	.0975	
Toners	lb.		

White

Lithopone (*bags*)	lb.	.0425/	.045
Albalith	lb.	.0425/	.045
Astrolith (50-*lb. bags*)	lb.	.0425/	
Azolith	lb.	.0425/	.045
Titanium Pigments			
Ray-Bar	lb.	.0575/	.0625
Ray-Cal	lb.	.055 /	.06
Rayox	lb.	.145 /	.155
Titanolith (50-*lb. bags*)	lb.	.056 /	.0575
Titanox-A LO and MO	lb.	.145 /	.15
C	lb.	.055 /	.0575
Ti-Tone	lb.		
Zopaque (50-*lb. bags*)	lb.	.145 /	.1525
Zinc Oxide			
Azo ZZZ-11	lb.	.0725/	.075
44	lb.	.0725/	.075
55	lb.	.0725/	.075
66	lb.	.095 /	.0975
French Process, Florence			
Green Seal-8	lb.	.09 /	.0925
Red Seal-9	lb.	.085 /	.0875
White Seal-7	lb.	.095 /	.0975
Kadox, Black Label-15	lb.	.0725/	.075
No. 25	lb.	.085 /	.0875
72	lb.	.0725/	.075
Red Label-17	lb.	.0725/	.075
Horse Head Special 3	lb.	.0725/	.075
XX Red-4	lb.	.0725/	.075
23	lb.	.0725/	.075
72	lb.	.0725/	.075
78	lb.	.0725/	.075
80	lb.	.0725/	.075
103	lb.	.0725/	.075
110	lb.	.0725/	.075
St. Joe (lead free)			
Black Label	lb.	.0725/	.075
Green Label	lb.	.0725/	.075
Red Label	lb.	.0725/	.075
U.S.P.	lb.	.105 /	.1075
Zinc Sulphide Pigments			
Cryptone-BA-19	lb.	.056 /	.0585
BT	lb.	.056 /	.0585
CB	lb.	.056 /	.0585
MS	lb.	.0575/	.06
ZS No. 20	lb.	.0825/	.085
86	lb.	.0825/	.085
230	lb.	.0825/	.085
800	lb.	.0825/	.085
Sunolith	lb.	.0425/	

Yellow

Cadmolith (cadmium yellow), (400-*lb. bbls.*)	lb.	.60	
Du Pont Powders	lb.	.70	/ 1.75
Mapico	lb.	.0685/	.071
Toners	lb.		

Dispersing Agents

Bardex	lb.	.0425/	.045
Bardol	lb.	.025 /	.0275
B	lb.	.05 /	.0525
Nevoll (*drums, c.l.*)	lb.	.02 /	.025

Extenders

Advagum 1098	lb.	.42	
1198	lb.	.40	
Extender C	lb.		
Naftolen R-100	lb.	.10 /	.12
Oroplast	lb.	.11 /	.155
"600"	lb.	.14 /	.16
Vanzak	gal.	.05 /	.06

Fillers, Inert

Asbestos Fiber	ton	15.50	/ 48.00
Barytes	ton	40.00	
f.o.b., St. Louis (50-*lb. paper bags*)	ton	25.55	
Off color, domestic	ton	29.00	
White, domestic	ton	38.50	/ 40.00
Blanc fixe, dry, precip.	ton	80.00	
Calcene	ton	37.50	/43.00
Infusorial earth	lb.	.0225	
Kalite No. 1	ton	26.00	
Kalvan	ton	100.00	
Magnesium carbonate *l.c.l.*	lb.	.0725/	.1075
Paradene No. 2 (*drums*)	lb.	.0525	
Pyrax A	ton	7.10	
Whiting			
Suprex White	ton	32.50	
Witco, *c.l.*	ton	8.00	
Witcarb	ton	100.00	
R-12	ton	50.00	

Finishes

Mica, *l.c.l.*	ton	20.00	/85.00
Rubber lacquer, clear	gal.	1.00	/ 2.00
Colored	gal.	2.00	/ 3.50
Shoe varnish	gal.	1.45	
Talc	ton	25.00	/35.00

Flock

Cotton flock, dark	lb.	.095 /	.112
Dyed	lb.	.45 /	.85
White	lb.	.12 /	.20
Rayon flock, colored	lb.	1.00	/ 1.50
White	lb.	.75	/ 1.25

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

†Because of difficulty in interpreting OPA ceilings, consumers should contact supply houses for prices.

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES
Light face type $1.00 per line (ten words)
Bold face type $1.25 per line (eight words)
Allow nine words for keyed address.

SITUATIONS WANTED RATES
Light face type 40c per line (ten words)
Bold face type 55c per line (eight words)
Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN RATES
Light face type 75c per line (ten words)
Bold face type $1.00 per line (eight words)
Replies forwarded without charge

SITUATIONS OPEN

EXCELLENT OPPORTUNITY

For experienced chemist or chemical engineer for position as Technical Representative in newly formed Philblack Division. State experience, education, availability, and starting salary desired.

PHILLIPS PETROLEUM COMPANY
Philblack Division — First Central Tower
Akron, Ohio

WANTED: CHEMIST, EXPERIENCED IN ALL phases of compounding molded rubber goods. Knowledge of synthetic and plastic compounding preferred, but not necessary. Eastern concern. Excellent opportunity. Address Box No. 817, care of INDIA RUBBER WORLD.

TIRE AND TUBE DEVELOPMENT, PROCESS, CONstruction and production engineers—Location, Pennsylvania. Address Box No. 819, care of INDIA RUBBER WORLD.

TIME STUDY AND MOTION ANALYSIS MEN—must have several years' experience with progressive company. Furnish complete history in first letter. Location away from Ohio. Address Box No. 820, care of INDIA RUBBER WORLD.

CHEMIST, EXPERIENCED IN DEVELOPMENT and control of synthetic rubber compounds. Good postwar prospects with small organization. Give full particulars and salary desired. Address Box No. 822, care of INDIA RUBBER WORLD.

A SMALL AND GROWING NORTHERN OHIO RUBBER COMPANY wants an experienced man to install and develop an effective technical department. Must be a graduate chemist or chemical engineer with organization ability, also a sound background of experience and accomplishment in compound, process and product development and control methods applying to mechanical molded products. An unusual opportunity for a competent result-getter to determine a most desirable future. Reply with full particulars of personal status, qualifications and salary requirements. Address Box No. 823, care of INDIA RUBBER WORLD.

TWO CHEMICAL ENGINEERS. BETWEEN 28 AND 40. ONE EXperienced in EXTRUSION OF NATURAL AND SYNTHETIC RUBBER. Other in TIRE DEVELOPMENT. Permanent, essential jobs. Midwestern rubber company with outstanding record of consistent growth and progressive planning. National and international business. Now developing postwar expansion program. State experience, education, salary requirements, etc. All inquiries will be acknowledged. Address Box No. 824, care of INDIA RUBBER WORLD.

EXPERIENCED CALENDER MAN FOR OPERATION of rubber calender for manufacture of rubber slabs for soles and heels. Factory location vicinity New York City. State age and all qualifications. Observe WMC rules. Address Box No. 825, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

TIRE DEVELOPMENT ENGINEER WITH DESIGN AND CONstruction experience. Plant located in Akron district. Give details of qualifications and experience in first letter. Address Box No. 826, care of INDIA RUBBER WORLD.

RUBBER DEPARTMENT HEAD. AN OUTSTANDING OPPORTUnity for capable draft-deferred man to take complete charge of rubber insulating department of electrical wire and cable manufacturing plant. Must have thorough knowledge of C. V. tubers, rubber mixing and handling. Must be able to handle personnel effectively. Generous salary to start. Excellent future. Address Box No. 827, care of INDIA RUBBER WORLD.

MAINTENANCE MAN—GOOD OPPORTUNITY WITH SMALL, fast-growing rubber company located in fine resort town. Permanent position. MARTIN RUBBER COMPANY, INC., Long Branch, New Jersey.

CALENDER MAN, MUST BE CAPABLE OF TAKING FULL charge of our Calender Room operations. A solid background of experience with Plastics and the coating of fabrics. With essential manufacturing experience with Vinyl, Plastics, and Synthetics. Give full history in first letter. Address Box No. 831, care of INDIA RUBBER WORLD.

CALENDER SPREADING DEPT. FOREMAN WANTED BY SMALL rubber company in New England manufacturing products very essential to war effort. Permanent postwar position with excellent chance for advancement to bigger position. Please state experience, age, draft status, and salary expected. Address Box No. 833, care of INDIA RUBBER WORLD.

SITUATIONS WANTED

COMPOUNDER-ENGINEER. EXPERIENCED IN COMPOUNDING and manufacture of mechanicals, tubes, pneumatic and solid tires, natural and synthetic rubber. Trained in production management by large company. Chemical Engineering Degree. California location desired because of children's health. Address Box No. 821, care of INDIA RUBBER WORLD.

SUPERVISOR OR FOREMAN. 20 YEARS' EXPERIENCE IN MIXing, compounding, calendering and spreading of proofing fabrics with several years in the manufacture of tires. Factory processing in synthetic, natural rubber, and plastic resins. Address Box No. 828, care of INDIA RUBBER WORLD.

PLANT MANAGER AND PRODUCTION ENGINEER available. More than 20 years in the manufacture of industrial rubber products. Trained and experienced in industrial engineering practices, departmental and plant layouts, unit systems and motion time analysis, product and equipment development. Able organizer and manager of any production problem in mechanicals. Address Box No. 829, care of INDIA RUBBER WORLD.

CHEMIST EXPERIENCED IN THE DEVELOPMENT OF COMpounds and factory production of synthetic and reclaimed rubber products desires change. At present employed. Any location. Address Box No. 830, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.
Our staff of chemists, engineers and bacteriologists with laboratories for analysis, research, physical testing and bacteriology are prepared to render you
Every Form of Chemical Service
304 Washington Street — Brooklyn 1, N. Y.

PHILIP TUCKER GIDLEY
Consulting Technologist — Synthetic Rubber
We are equipped to perform all types of physical and chemical tests for synthetic rubber.
Fairhaven — Massachusetts

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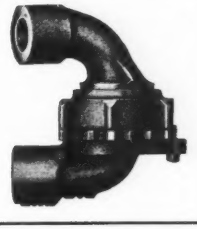
and pipe make the ideal steam connection for platen presses

FLEXO SUPPLY COMPANY, 4218 Olive Street, St. Louis



(Classified Advertisements Continued on Page 233)

Latex Compounding Ingredients

Accelerator 89	lb.	$1.20	
Aerosol (*drums*)	lb.	.35	
Antox, dispersed	lb.	.54	
Aquarex F	lb.	.85	
Areskap No. 50	lb.	.18	/$0.24
100, dry	lb.	.39	/ .51
Aresket No. 240	lb.	.16	/ .22
300, dry	lb.	.42	/ .50
Aresklene No. 375	lb.	.35	/ .50
400 dry	lb.	.51	/ .65
Black No. 25, dispersed	lb.	.22	/ .40
Casein	lb.	.24	/.2475
Color pastes, dispersed	lb.	.75	/ 1.10
Copper Inhibitor X-872	lb.	2.25	
Darvan No. 1	lb.	.30	/ .34
2	lb.	.30	/ .34
Dispersex No. 15	lb.	.11	/ .12
20	lb.	.08	/ .10
Factex Dispersion A	lb.	.185	
Heliozone, dispersed	lb.	.25	
MICRONEX, Colloidal	lb.	.06	/ .07
Neoprene Latex Extender Emulsion 17	lb.	.12	/ .14
R-2 Crystals	lb.	1.55	
S-1 (400-*lb. drums*)	lb.	.65	
Santobrite Briquettes	lb.		
Powder	lb.		
Santomerse D	lb.	.41	/ .65
S	lb.	.11	/ .25
Sodium Stearate	lb.	.40	
Stablex A	lb.	.90	/ 1.10
B	lb.	.70	/ .95
C	lb.	.40	/ .50
Sulphur, dispersed	lb.	.10	/ .15
No. 2	lb.	.08	/ .12
T-1 (440-*lb. drums*)	lb.	.40	
Tepidone	lb.	.63	
Tysonite, dispersed	lb.	.32	/ .35
Zinc oxide, dispersed	lb.	.12	/ .15

Mineral Rubber

Black Diamond, *l.c.l.*	ton	25.00	/30.00
B.R.C. No. 20	lb.	.0105	/.0115
Hydrocarbon, Hard	ton	25.00	/27.00
MilliMar	lb.	.055	
Parmr	ton	25.00	/30.00
Pioneer, *c.l.*	lb.	25.00	/30.00
285°-300°	ton	25.00	/27.00

Mold Lubricants

Aluminum Stearate	lb.	.23	/ .24
Aquarex D	lb.	.60	
MDL Paste	lb.	.25	
Colite	gal.	.90	/ 1.15
Dipex Mold Wash	lb.		
Lubrex	lb.	.25	/ .30
Rubber-Glo, conc. regular	gal.	.94	/ 1.15
Type W	gal.	.99	/ 1.20
Sericite	ton	65.00	
Soapstone, *l.c.l.*	ton	25.00	/35.00
Zinc Stearate	lb.	.30	/ .31

Oil Resistant

A-X-F	lb.	.82	/ .85

Reclaiming Oils

B.R.V.	lb.	.035	/ .0375
C-10	gal.	.19	/ .24
D-4	gal.	.17	/ .22
E-5	gal.	.15	/ .20
No. 1621	lb.	.021	/ .0235
S.R.O.	lb.	.02	/ .0225
X-60 (reclaiming)	gal.	.20	/ .27
X-443	gal.	.29	

Reenforcers

Alumina, Hydrated			
Alorco C-740	lb.	.0375	/ .065
C-741	lb.	.0375	/ .065
Buca	ton	40.00	
Carbon Black			
Aerofloted Arrow Specification (*bags only*)	lb.	.0355‡	
Arrow Compact Granulized	lb.	.0355†	
Certified Heavy Compressed (*bags only*)	lb.	.0355†	
SPHERON	lb.	.0355†	/ .07
Channel "S"	lb.	.12	
Continental, dustless	lb.	.0355†	
"AA"	lb.		
Compressed (*bags only*)	lb.	.0355†	
Continex SRF	lb.	.035	/ .055
Dispersion	lb.	.0355†	
Dixie	lb.	.0355†	
20	lb.	.035†	
Dixiedensed	lb.	.0355†	
66	lb.	.0355†	
77	lb.	.0355†	
Furnex Dense	lb.	.035	/ .06
Beads	lb.	.035	/ .06
Gastex	lb.	.035	/ .06
HX	lb.	.0355†	
Kosmobile	lb.	.0355†	
66	lb.	.0355†	
77	lb.	.0355†	
S	lb.	.0355†	
Kosmos	lb.	.0355†	
20	lb.	.035†	
MICRONEX Beads	lb.	.0355†	/.075
Hi-Tear	lb.	.0355/	.075
Mark II	lb.	.0355/	.075
Standard	lb.	.0355/	.075
W-6	lb.	.0355/	.075
Modulex	lb.	.05	
P-33	lb.	.0475	
Pelletex	lb.	.035	/ .06
Philblack A	lb.	.05	/ .06
SPHERON C (*bags*)	lb.	$0.0455†	
I (*bags*)	lb.	.0405	
N (*bags*)	lb.	.15	
T (*bags*)	lb.	.09	
Statex A	lb.	.08	/ $.10
B	lb.	.07	/ .09
STERLING	lb.	.035	
Thermax	lb.	.0225	
"S"	lb.	.0675	
TX	lb.	.0355†	
Velvetex	lb.		
Witco SRF	lb.	.035	/ .055
"WYEX BLACK"	lb.	.0355†	
Carbonex Flakes	lb.	.03	/ .035
S	lb.	.031	/ .036
Plastic	lb.	.031	/ .0335
Clays			
Aerfloted Hi-White	ton	10.00	
LGB	ton	15.00	
Paragon (50-*lb. bags*)	ton	10.00	
Suprex (50-*lb. bags*)	ton	10.00	/23.50
Catalpo, *c.l.*	ton	30.00	
Champion	ton	11.00	
China	ton	25.00	
Dixie	ton	11.00	
"L"	ton	10.00	
Langford	ton	8.50	
Magnolia	ton	10.00	
McNamee	ton	10.00	
#33	ton	30.00	
Par	ton	11.00	
Paraforce, *c.l.*	ton	50.00	
Witco, *c.l.*	ton	10.00	
Cumar EX	lb.	.05	
MH	lb.	.065	/ .115
V	lb.	.095	/ .125
465 Resin	lb.		
"G" Resin	lb.		
Nevindene	lb.		
Silene "EF"	lb.	.055	/ .06

Reodorants

Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Para-Dors (ABCD)	lb.	1.00	/ 3.40
Rodo No. 0	lb.	4.00	/ 4.50
10	lb.	5.00	/ 5.50

Rubber Substitutes

Black	lb.	.095	/ .17
Brown	lb.	.095	/ .18
White	lb.	.10	/ .20
Factice			
Amberex Type B	lb.	.20	
Brown	lb.	.095	/ .19
Neophax A	lb.	.165	
B	lb.	.165	
White	lb.	.10	/ .20
Polyester, Millable 56-40A	lb.	.36	/ .38
Vulprene 72-28AR	lb.	.38	/ .45
Dispersion B7-41	lb.	.25	/ .26
Emulsion D4-31A	lb.	.29	/ .30

Softeners and Plasticizers

Abalyn	lb.	.0722/	.0947
Ambidex Regular	lb.	.225	/ .23
"S"	lb.	.225	/ .23
B.R.T. No. 7	lb.	.02	/ .021
Belro Resin	100 lb.	2.71	/ 3.00
Bondogen	lb.	.98	/ 1.05
Buna Modifier 56-40	lb.	.30	/ .31
Burnatol (for synthetic rubber)	lb.		
G	lb.	.40	/ .50
S	lb.	.40	/ .50
Burgundy pitch	lb.		
Circosol-2XH Elasticator for GR-S	gal.		
Copene Resin	lb.	.32	
Dibenzyl Sebacate	lb.	.67	/ .74
Dibutyl Sebacate	lb.	.48	/ .55
Dicapryl Phthalate	lb.	.25	/ .30
Dipentene	gal.	.56	/ .58
Dipolymer Oil	gal.	.33	/ .38
Dispersing Oil No. 10	lb.	.0375/	.04
Duraplex C-50 LV, 100°	lb.	.25	/ .295
Falkomer 106	lb.	.30	
108	lb.	.30	
Galex	lb.	.065	/ .20
Hercolyn	lb.	.1122/	.1347
LM-Nypene (*drums*)	lb.	.25	
LX-436 (*tank car*)	lb.	.027	
Myristilene	lb.	.20	/ .30
Nevinol	lb.	.13	/ .14
No. 16 Resin	lb.	.60	
Nuba resinous pitch (*drums*)			
Grades No. 1 and No. 2	lb.	.29	
3-X	lb.	.0425	
Nypene Resin	lb.	.32	
Palm oil (Witco) *c.l.*	lb.		
Palmalene	lb.	.15	
Palmol	lb.	.16	/ .25
Para Flux (reg.)	gal.	.17	/ .18
No. 2016	gal.	.135	/ .19
Para Lube	lb.	.046	/ .048
Paradene No. 1 (*drums*)	lb.	.0525	
Special (*drums*)			
20 to 35° C. M.P.	lb.	.0625	
35 to 45° C. M.P.	lb.	.0625	
45 to 75° C. M.P.	lb.	.0575	
Paroils	lb.	.0975/	.18
Piccocizer "30"	lb.		
Piccolyte Resins	lb.	.15	/ .185
Piccoumaron Resins	lb.	.045	/ .15
Pictar	gal.	.18	/ .23
Pine tar	gal.		
Oil	gal.	.45	
Plasticizer B	lb.	$0.35	/$0.45
35	lb.	.20	/ .235
Plastoflex No. 10	lb.	.20	
No. 20	lb.	.25	
Plastogen	lb.	.0775/	.08
Plastone	lb.	.27	/ .30
Poly-pale Resin	lb.	.06	/ .07
R-19 Resin (*drums*)	lb.	.1075	
21 Resin (*drums*)	lb.	.1075	
Reogen	lb.	.115	/ .12
Resin R6-3	lb.	.38	/ .40
Rio Resin	lb.	.36	/ .38
RPA No. 1E	lb.	.55	
2	lb.	.65	
3	lb.	.46	
4	lb.	.80	
5	lb.	.57	
Solvenol	gal.	.56	/ .58
Staybelite	lb.	.06	/ .065
Tarzac	lb.	.23	/ .24
TP-10	gal.	.55	/ .75
90	gal.	.55	/ .65
Turgum	lb.	.07	/ .0735
"S"	lb.	.0625/	.0675
Vinsol Resin	lb.	.025	/ .035
Vistac No. 1	lb.	.20	/ .214
No. 2	lb.	.214	/ .227
Witco No. 20, *l.c.l.*	gal.	.20	
X-1 resinous oil (*tank car*)	lb.	.011	/ .016
XX-100 Resin	lb.	.0525	

Softeners for Hard Rubber Compounding

Resin C Pitch 45°C. M.P.	lb.	.015	/ .016
60°C. M.P.	lb.	.015	/ .016
75°C. M.P.	lb.	.015	/ .016

Solvents

Beta-Trichlorethane	lb.	.20	
Carbon Bisulphide	100 lbs.	5.75	
Tetrachloride	gal.	.80	
Cosol No. 1	gal.	.26	
No. 2	gal.	.25	
No. 3	gal.	.22	
Industrial 90% benzol (*tank car*)	gal.	.15	/ .22
Nevsol	gal.	.245	/ .31
Picco	gal.	.22	/ .32
Skellysolve	gal.		

Stabilizers for Cure

Barium Stearate	lb.	.29	/ .32
Calcium Stearate	lb.	.26	/ .27
Laurex (*bags*)	lb.	.1475/	.1725
Lead Stearate	lb.		
Magnesium Stearate	lb.	.31	/ .32
Stearex, single pressed	lb.	.15 3/8	/ .16 3/8
double pressed	lb.	.15 7/8	/ .16 7/8
Beads	lb.	.14 7/8	/ .15 7/8
Stearic acid, single pressed	lb.		
Stearite, *c.l.*	lb.	.1487	
Zinc Laurate	lb.	.29	/ .32
Stearate	lb.	.30	/ .31

Synthetic Rubber

Chemigum N-1	lb.	.53	/ .60
Hycar OR-15	lb.	.56	/ .72
OR-25	lb.	.50	/ .66
OS-10	lb.	.50	/ .66
Neoprene Latex Type 571 dry weight	lb.	.50	
60	lb.	.60	
Neoprene Type CG	lb.	.70	
E	lb.	.65	
FR	lb.	.75	
GN	lb.	.28	
ILS	lb.		
KNR	lb.	.75	
Perbunan 26	lb.	.53	
Synthetic 100	lb.	.41	
"Thiokol" Type "A"	lb.	.35	/ 1.40
"FA"	lb.	.50	/ 1.60
Molding powder No. 472	lb.	.61	
1001	lb.	.75	
Water Dispersions ("Thiokol" Latex) dry weight			
MF	lb.	.70	/ .80
MX-3112	lb.	.65	/ .75
WD-2	lb.	.75	/ .85

Tackifiers

B.R.H. No. 2	lb.	.02	/ .021
Buna Tackifier 56-36	lb.	.28	/ .30
LX-433 (*tank car*)	lb.	.068	
P.H.O. (*drums*)	lb.	.24	
Plastac	lb.	.12	
TY-PLY Q	gal.	6.75	/ 8.00
A	lb.	6.75	/ 8.00
S	gal.	6.75	/ 8.00
A	gal.	6.75	/ 8.00

Vulcanizing Ingredients

Magnesia, light (for neoprene)	lb.	.25	
Sulphur	100 lbs.	2.05	
Chloride (*drums*)	lb.	.04	
Telloy	lb.	1.75	
Thiogen 6	lb.	.18	/ .25
10	lb.	.18	/ .25
Tonox	lb.	.50	/ .59
Vandex	lb.	1.75	

(See also Colors—Antimony)

Waxes

1515-A (black)	gal.	1.35	
C (clear)	gal.	1.25	
Carnauba, No. 3 chalky	lb.	.7125	
2 N.C.	lb.	.7575	
3 N.C.	lb.		
1 Yellow	lb.	.8325	
2	lb.	.8125	
Carnube	lb.	.49	/ .59
Monten	lb.	.12	/ .17
Rubber Wax No. 118			
Neutral	gal.	.76	/ 1.31
Colors	gal.	.86	/ 1.41

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

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Classified Advertisements

Continued

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2—15" x 36" RUBBER MILLS, COMPLETE WITH 75 H.P. MOTOR and drive. Address Box No. 832, care of INDIA RUBBER WORLD.

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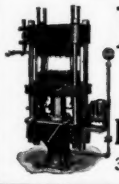

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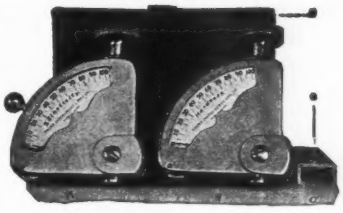

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(Classified Advertisements Continued on Page 235)

FINANCIAL

Aluminum Co. of America, Pittsburgh, Pa. For 1943: net income, $42,901,570, equal, after preferred dividends, to $7.95 each on 4,496,415 common shares, contrasted with $33,361,762, or $5.93 a share, in 1942.

American Cyanamid Co., New York, N. Y. For 1943: $6,653,118, or $2.27 a share, contrasted with $5,213,440, or $1.78 a share, in 1942; taxes, $20,000,000, against $15,553,461.

American Hard Rubber Co., New York, N. Y. For 1943: net profit, $228,847, or $1.05 a common share, against $330,548, or $2.18 a share, in 1942.

Belden Mfg. Co., Chicago, Ill. For 1943: net profit, $430,584, or $1.78 a share, against $459,247, or $1.90 a share, in 1942; sales, $11,176,237, against $10,271,814; taxes, $1,104,000, against $1,232,000.

Brown Rubber Co., Inc., Lafayette, Ind. For 1943: net profit, subject to renegotiation, $94,404, equal to 45¢ a share, contrasted with net loss of $93,867 in 1942; gross sales, $540,635; provision for federal taxes, $1,500; current assets, December 31, 1943, $204,881; current liabilities, $84,553.

Canada Wire & Cable Co., Toronto, Ont., Canada. For 1943: Net profit, $943,087, against $1,091,181 in 1942; dividends paid, $431,836, against $606,604; net working capital $4,946,099, against $4,810,124.

Crown Cork & Seal Co., Ltd. For 1943: net income (Canadian currency), $270,642, or $2.71 a share, against $252,310, or $2.52 a share, in 1942.

Crown Cork & Seal Co., Inc., Baltimore, Md., and wholly owned domestic subsidiaries. For 1943: net profit, $1,637,056 (subject to renegotiation), equal to $2.18 a common share, contrasted with $1,458,564, or $1.84 a share, in 1942; net sales, $53,506,813, against $45,044,118; income taxes $2,660,809, against $2,743,217.

Eagle-Picher Lead Co., Cincinnati, O., and subsidiaries. Quarter ended February 29, 1944: net profit, $390,448, equal to 43¢ a common share, contrasted with $475,338, or 52¢ a share, in the corresponding period a year earlier; net sales, $11,348,000, against $10,058,000.

Detroit Gasket & Mfg. Co., Detroit, Mich., for 1943: net profit, $519,096, equal to $2.21 a common share, against $412,707, or $1.71 a share in 1942.

Dewey & Almy Chemical Co., Cambridge, Mass. For 1943: net profit, $566,003, equal, after preferred dividends, to $1.88 each on 301,223 common shares, contrasted with $533,263, or $1.81 each on 295,317 common shares, in 1942; sales, $8,905,796, 24% and 18%, respectively, above the figures for 1942 and 1941.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., Canada. For 1943: net profit, $211,506, compared to $169,235 in 1942; net taxes, $694,000, against $650,000; refundable portion of excess profits tax, $140,000, against $75,000; earned surplus, $747,451, against $605,513 after 5% dividend on preferred and 50¢ on common; current assets, $4,181,170, against $3,747,514; current liabilities, $842,866, against $584,274; working capital, $3,338,304, against $3,163,240.

Flintkote Co., New York, N. Y. For 1943: consolidated net income: $1,250,276, equal to $1.51 a common share, against $1,518,154, or $1.88 a share, in 1942 after adjustment for renegotiation; net sales, $30,998,161, against $31,906,953.

General Electric Co., Schenectady, N. Y. For 1943: net income, $44,922,846, equal to $1.56 a common share, against $45,081,458, or $1.56 a share, in 1942; net sales $1,357,780,047, against $977,774,626; provision for federal income and excess profits taxes, $206,000,000, against $193,000,000; current assets, $391,146,454, against $379,962,751; current liabilities, $195,118,034, against $204,861,494.

Goodyear Tire & Rubber Co., Akron, O., and subsidiaries. For 1943: consolidated net sales, $760,491,044 (subject to renegotiation), against $451,493,034; net earnings, $21,479,048 (subject to renegotiation), against $14,370,911; current assets, including $27,336,297 cash, $196,221,262, against $186,171,203, including $24,123,082 cash, the end of '42; current liabilities, $55,745,545, against $66,407,835; provision for income and excess profits taxes, $81,996,282, against $21,957,794; provision for contingencies, $5,000,000, against $8,000,000.

Hewitt Rubber Corp., Buffalo, N. Y. For 1943: net profit, $611,883, equal to $3.64 a share, against $442,543, or $2.65 a share, in 1942; net sales $16,794,100, against $12,082,934.

Intercontinental Rubber Co., New York, N. Y. For 1943: net income, $595,524, equal to nearly $1 each on 595,832 capital shares, against $565,781 in 1942; sales, $3,498,571, against $2,382,409; current assets, including $323,144 cash, $2,760,291, against $2,941,459, including $1,716,208 cash; current liabilities, $501,120, against $282,301; taxes, $425,255, against $139,228.

St. Joseph Lead Co., New York, N. Y., and subsidiaries. For 1943: net profit, $4,033,974, equivalent to $2.06 a share, contrasted with $5,655,625, or $2.89 a share, in 1942; net sales, $47,099,749, against $51,360,604; federal taxes, $1,690,262, against $5,543,393.

Timken Roller Bearing Co., Canton 6, O., and subsidiaries. For 1943: net profit, $6,429,163, equal to $2.65 a share, contrasted with $6,475,262, or $2.68 a share, the year before; reserve for contingencies, $1,200,000, against $1,455,000.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$0.25	Apr. 17	Apr. 6
Baldwin Rubber Co.	Com.	0.125	Apr. 21	Apr. 15
Boston Woven Hose & Rubber Co.	Com.	0.50	May 25	May 15
Collyer Insulated Wire Co.	Com.	0.50	Apr. 1	Mar. 23
Converse Rubber Co.	Sp. Pfd.	0.30 s.	Apr. 18	Apr. 10
Crown Cork & Seal Co., Inc.	Com.	0.25	Apr. 18	Apr. 10
Dayton Rubber Mfg. Co.	Com.	0.25	Apr. 25	Apr. 10
Dayton Rubber Mfg. Co.	Pfd.	0.50	Apr. 25	Apr. 10
Detroit Gasket & Mfg. Co.	Com.	0.25	Apr. 25	Apr. 8
Detroit Gasket & Mfg. Co.	Pfd.	0.30 q.	June 1	May 13
De Vilbiss Co.	7% Pfd.	0.175 q.	Apr. 15	Mar. 27
Dewey & Almy Chemical Co.	Com.	0.25 q.	June 15	May 31
Dewey & Almy Chemical Co.	B	0.25 q.	June 15	May 31
Firestone Tire & Rubber Co.	Pfd.	1.125 q.	June 1	May 15
Garlock Packing Co.	Com.	0.50	Mar. 31	Mar. 25
General Cable Corp.	7% Pfd.	1.75	May 1	Apr. 22
General Tire & Rubber Co.	Com.	0.50	Apr. 17	Apr. 7
Hercules Powder Co.	Pfd.	1.50 q.	May 15	May 4
Lee Rubber & Tire Corp.	Com.	0.50 q.	May 1	Apr. 15
Lima Cord Sole & Heel Co.	Com.	0.10	Mar. 31	Mar. 20
Midwest Rubber Reclaiming Co.	Com.	0.50 q.	May 1	Apr. 21
Mohawk Rubber Co.	Com.	0.50	Apr. 15	Mar. 25
Norwalk Tire & Rubber Co.	Pfd.	0.875 q.	July 1	June 15
U. S. Rubber Reclaiming Co., Inc.	Pfd.	0.50	Apr. 11	Apr. 4

Ontario Section

(*Continued from page 185*)

discussed "The Manufacture of Synthetic Rubber in Canada." Dr. Grace stated that Canada was now almost entirely self-sufficient with regard to rubber and presented slides showing the crude and synthetic rubber consumption before Pearl Harbor in comparison with the present consumption of synthetic rubber. Chemical formulae for all the principal types of synthetic rubber were also shown, and Dr. Grace also outlined the sources being used for the manufacture of the primary raw materials, such as butadiene, styrene, etc. Slides of the Polymer plant at Sarnia were next shown, and the film "R for Rubber" which contained more views of this plant was then presented. The "Thiokol" plant, owned and operated by Naugatuck Chemicals, Ltd., at Elmira, Ont., also was discussed and illustrated. This plant came into production early in 1943 and has an annual capacity of 500 long tons. The mechanism of the production of "Thiokol" from sodium polysulphide and ethylene dichloride was explained. Dr. Grace concluded his talk with a showing of more slides of the United States Government plants at Institute, W. Va., and Port Neches, Tex.

The election of officers for the 1944-45 term was held with the following being elected: H. G. Deline, Dunlop Tire & Rubber Goods Co., Ltd., chairman; and J. W. Holmes, Jr., Polymer Corp., secretary-treasurer. Members elected to the executive committee were: R. A. Hayworth, Goodyear Tire & Rubber Co. of Canada, Ltd.; G. F. Rishor, Canadian General Electric Co., Ltd.; and R. M. Ferguson, Naugatuck Chemicals.

It was announced that a joint luncheon would probably be held with the Buffalo Rubber Group at the American Chemical Society, Division of Rubber Chemistry, meeting in New York on April 28. This would replace the joint meeting of the Ontario and Buffalo Groups usually held at Niagara Falls.

It was also announced that arrangements are being made to hold a technical session on rubber during the Canadian Chemical Conference to be held in Toronto, June 5 to 7 inclusive. The session is planned for the morning of June 6 at the Royal York Hotel.

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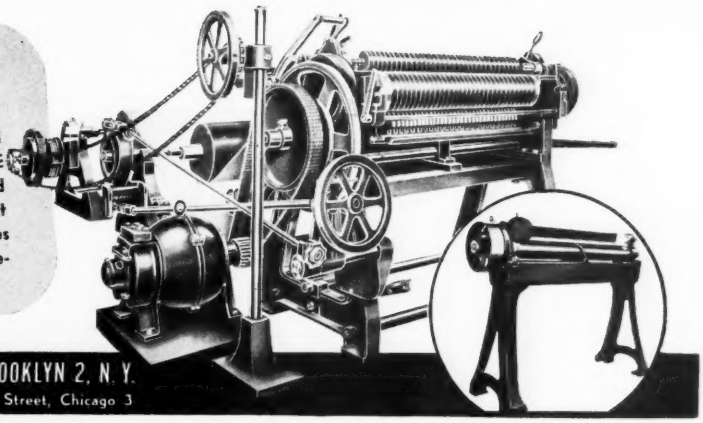

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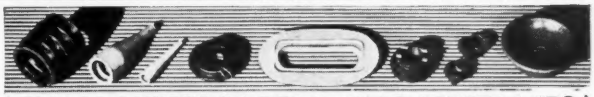

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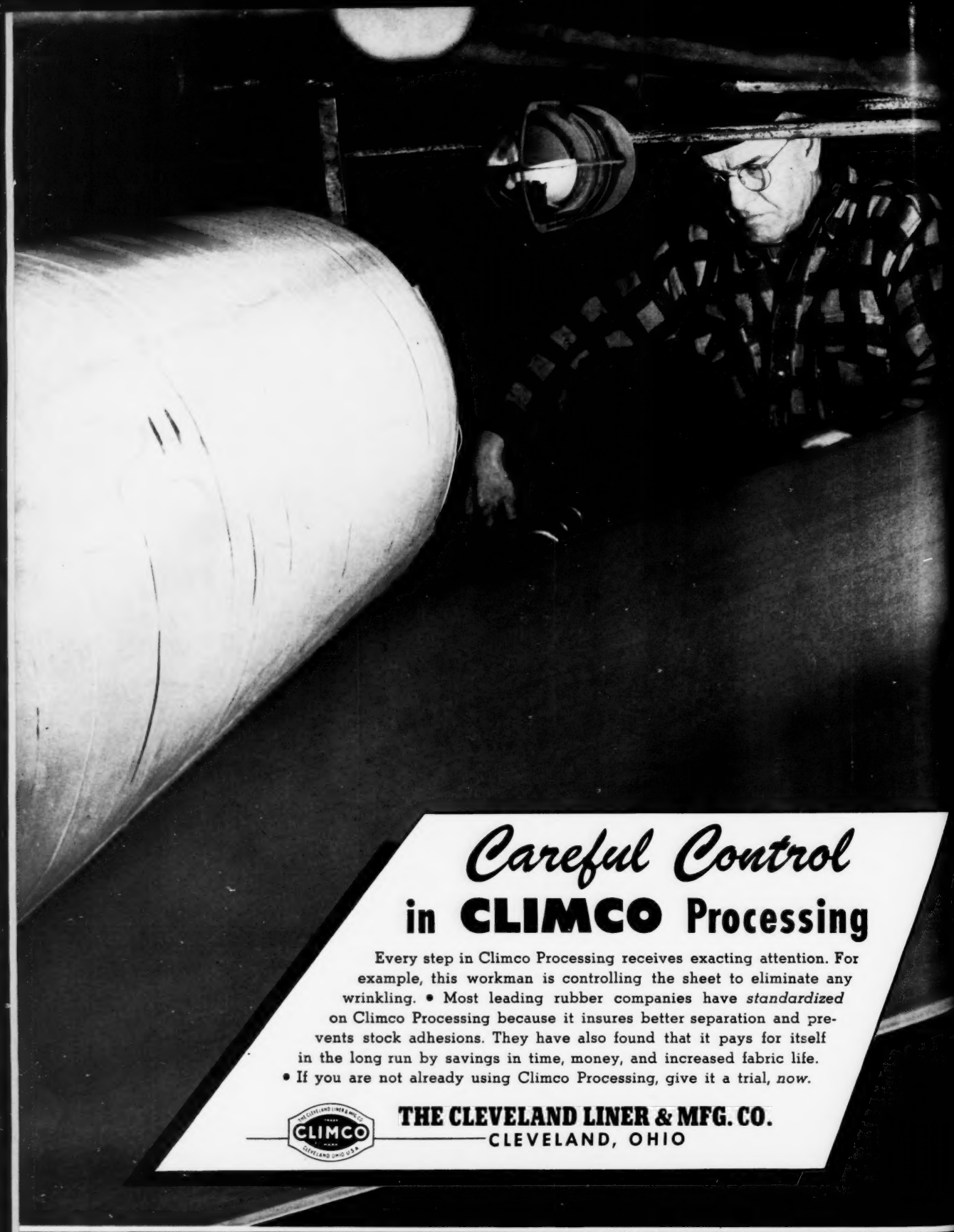

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